Notes on Structural Integration

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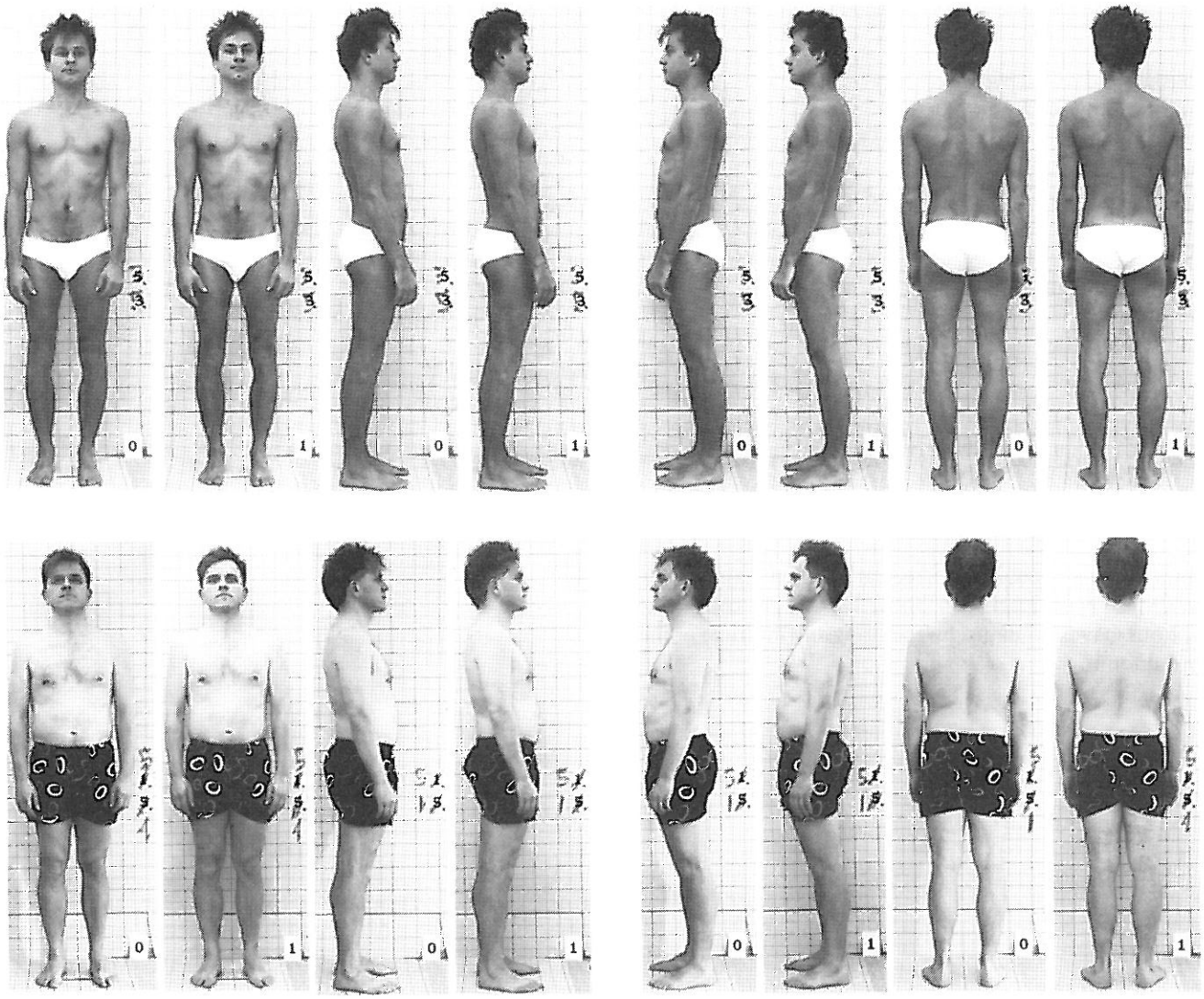
Wolf Wagner

How can we know what works?

A Project Report on the Value of Photographs

Once after a first session of Rolfing I had forgotten to change the numbers from zero to one before taking pictures. When I then looked at the developed pictures I was shocked to find out that I had great difficulties to decide which were the before and which the after pictures. And afterwards I wasn't at all very certain about my decision. Shocked I was because before this incident I had always seen quite a lot of changes in the photographs when I knew them to be pictures taken after the session. Now I was not so certain anymore whether I had really seen those changes or whether I had made myself be-



lieve to see them just because knowing they were after pictures made me know what to see.

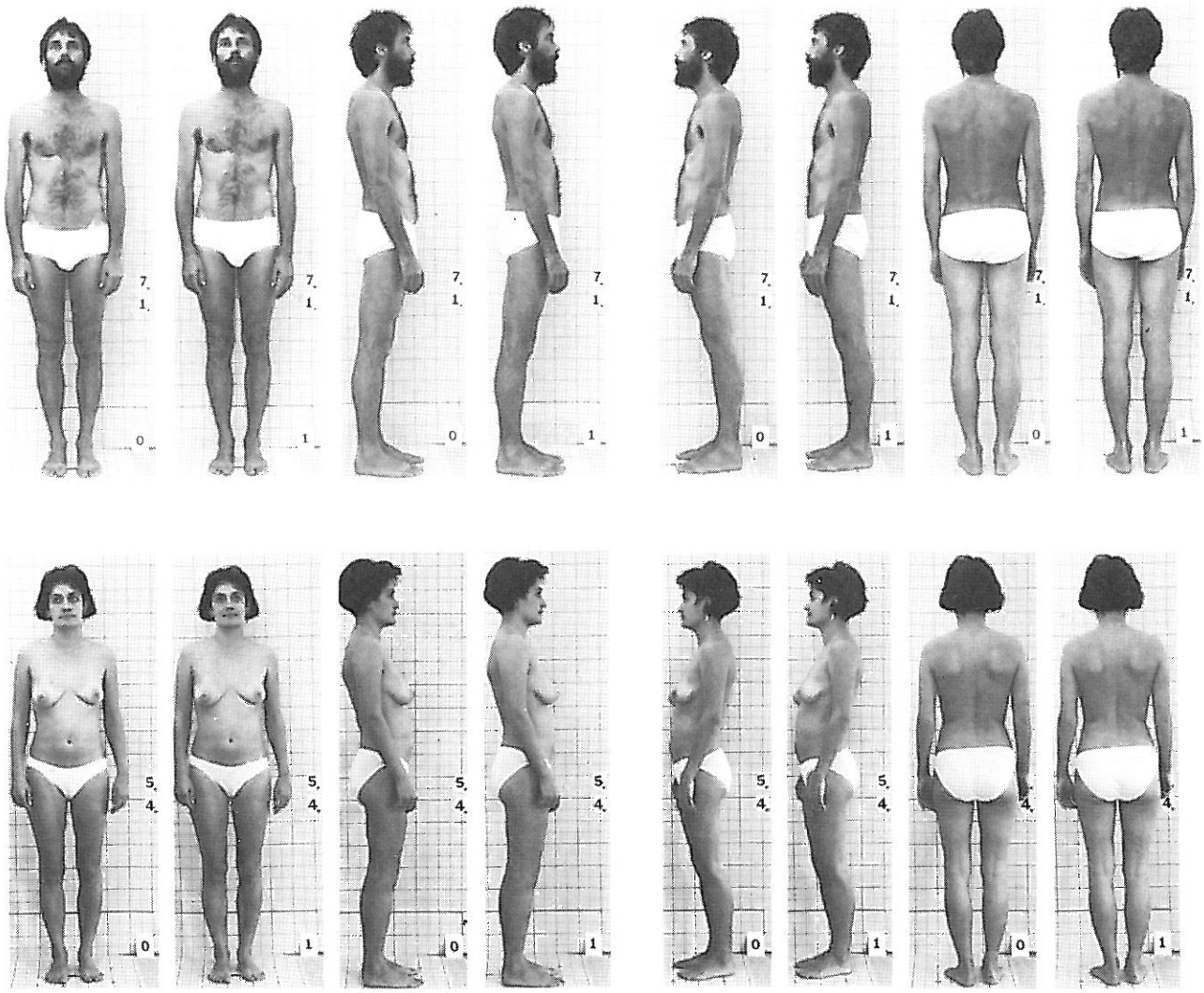
Since I am vain enough to think that what happened to me can happen to most others, I suggested to other Rolfers to get a little project started on the value of photographs. I wanted to find out: *Do photographs show Rolfing changes in such a way that Rolfers can identify them and distinguish them from changes that have other causes?* Please note that in this question I do not doubt that Rolfing causes changes or that Rolfers can see changes. I merely question whether photographs are a means by which Rolfers can identify the effects of their work and distinguish these from the effects of other factors like simple relaxation, accidental changes in position, or suchlike things.

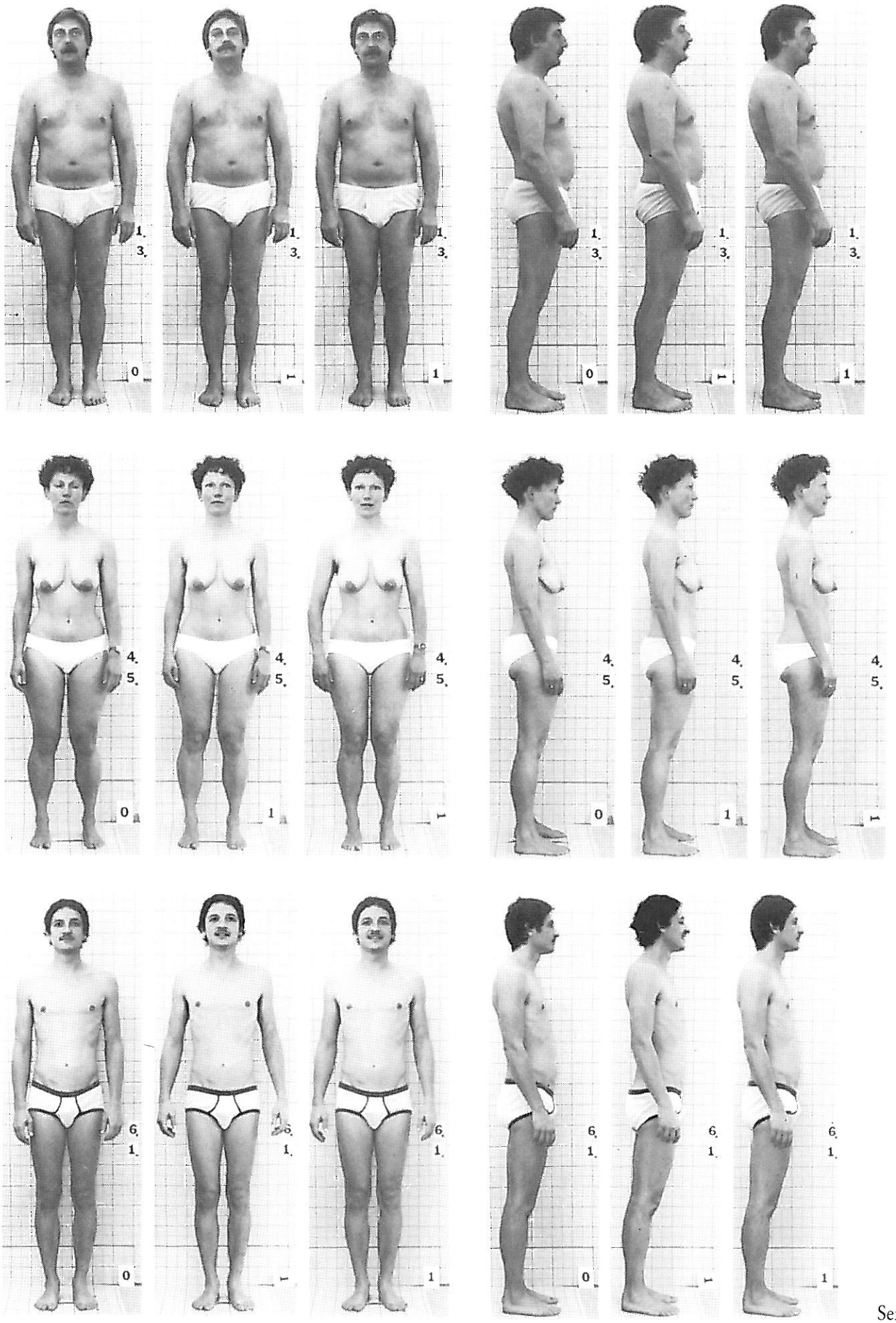
I consider this question to be of considerable importance. For, if it was answered with yes, then we would be able to use photographs to find out for example what kind of hamstring-work produces best results with a certain structural type. It would be an answer to the question: How can we know what works? Without such an answer we are left to subjective claims that cannot be proved or refuted, and therefore we are left to the contentions of those who most persuasively can seduce or bully others into believing that they do «great work».

Why use photographs when you can look at the client himself? The client is three-dimensional, you can see him move and breathe, you can see him change. That is the best test whether a Rolfing intervention works. This very legitimate and widespread view of the problem for me personally has the drawback that rarely – if ever – do I see the change happening, and equally rarely – if ever – do I have an exact enough memory of how things looked and moved before the intervention to precisely judge the change effected. But there are also some more objective drawbacks: the change has to be documented in some way by as exact a description of the before and after situation as possible which implies measurements. These tend to be tedious both for client and practitioner and do not permit for recognizing change in the whole «Gestalt». And naturally a majority vote of those who look at a client and agree that «something happened in the back» will not do at all, since many psychological experiments have shown how such protocols are open to influences like pressure by authoritative persons or wanting to conform with a belief system to the point where things are «seen» no independent viewer can discern.

Photographs have a bit more of an objective quality. You can look at them over and over again, compare the before and after situation, compare it to what viewers say about it,

Series 1





Series 2

Table I

Method A = Rolfing

	AR			ER			BR		
	16	41	34	33	35	65	23	55	21
T 1	D	B	B	B	[A]	[A]	[A]	[A]	[A]
T 2	C	C	[A]	[A]	D	D	[A]	C	B
T 3	B	C	B	B	D	[A]	[A]	[A]	C
A 1	D	B	B	[A]	[A]	C	[A]	B	[A]
A 2					[A]		[A]		[A]
A 3	B	C	C	B	[A]	D	[A]	[A]	B
B 1	BC	BC	[A]	BC	[A]	BC	BC	BC	D
B 2	[A]	B	D	C	C	D	B	[A]	[A]
	Sum: 26 A, 15 B, 10 C, 9 D								

Method B = Reiki

	11	22	51	14	32	45	61	44	46
T 1	[A]	C	[A]	D	D	C	B	C	D
T 2	C	[A]	[A]	B	D	B	C	D	C
T 3	[A]	[A]	[A]	C	C	C	B	D	C
A 1	B	C	[A]	B	C	C	[A]	D	D
A 2	[A]			[A]		[A]	[A]		
A 3	B	[A]	C	B	[A]	B	[A]	D	D
B 1	D	BC	BC	[A]	[A]	BC	[A]	BC	BC
B 2	[A]	[A]	D	B	[A]	B	[A]	C	D
	Sum: 23 A, 11 B, 15 C, 13 D								

Method C = Massage

	71	17	13	53	15	31	43	12	37
T 1	D	C	[A]	B	C	[A]	B	C	B
T 2	[A]	C	B	C	[A]	B	B	B	D
T 3	D	B	[A]	B	C	[A]	D	[A]	B
A 1	[A]	C	[A]	D	[A]	C	C	B	D
A 2				[A]					
A 3	C	C	D	D	C	C	B	D	C
B 1	[A]	[A]	[A]	D	[A]	BC	D	D	BC
B 2	C	C	D	B	B	C	D	D	D
	Sum: 15 A, 14 B, 17 C, 16 D								

Method D = Nothing

	54	77	63	79	97	75	28	98	83
T 1	C	C	D	C	D	D	B	B	D
T 2	B	[A]	C	[A]	D	B	D	D	D
T 3	D	D	D	C	D	D	B	B	C
A 1	B	C	D	D	B	B	D	D	C
A 2	[A]								
A 3	D	[A]	B	D	[A]	[A]	C	D	B
B 1	BC	D	D	D	D	BC	BC	BC	BC
B 2	B	C	B	C	[A]	[A]	[A]	C	D
	Sum: 9 A, 13 B, 12 C, 25 D								

(AR or A: Advanced Rolfer; ER: Experienced Rolfer; BR or B: Beginner; T: Teacher; horizontal numbers: photograph codes)

Result no.1: Rolfers can distinguish the photographs of persons who had a first session of Rolfing from those who had Massage, Reiki, or Nothing in a significantly more than probable frequency (2,5% niveau).

Result no.2: Rolfers can best distinguish post-Rolfing photographs from photographs of persons who have had Nothing (0,5% niveau).

Result no.3: Without the photographs after Nothing Rolfers tend to be able to distinguish post-Rolfing photos from those after Reiki or Massage, but in 30 of 100 experiments the same result could have been produced by sheer chance (30% niveau).

Result no.4: Rolfers particularly fail to be able to distinguish post-Reiki pictures from post-Rolfing pictures. Nearly as many post-Reiki pictures are taken to be post-Rolfing pictures as post-Rolfing pictures are correctly identified (0,05 niveau).

and even measure whether what they say is true. Photographs can be reproduced in any number so that they can be scrutinized in seclusion without group influence or other pressures. And although one does lose movement and the third dimension, still a lot of the «Gestalt» changes can be represented in a photograph. Therefore, I think photographs could be the ideal instrument for this journal to practically test the theories on Structural Integration and the technique of Rolfing. This should be enough to demonstrate the relevance of such a study on the value of photographs for the development of practical research.

Let me introduce to you this little project by asking you to put yourself to the same test the participants had to go through, only on a much smaller scale: Series 1 shows four sets of photographs of four people marked with a code number and with a zero for before and a one for after. One of these persons has received a first session of Rolfing without ever having been Rolfed before. One of them received a full-body Swedish Massage lasting about one hour. Another person of the four received a one hour session of Reiki. Reiki claims to be a healing treatment by Universal Energy which practitioners have to be initiated to by a mystic ritual. Apart

Table II

Reiki

	22	11	51	14	32	45	61	44	46	c	w
R	a	a	a	a	b	b	a	a	b		
1	a	a	b	a	b	a	a	a	a	6	3
2	a	b	b	b	b	a	a	b	b	4	5
3	a	a	a	a	b	a	b	b	a	5	4
4	a	a	b	a	a	b	a	b	b	6	3
5	a	b	b	a	b	a	a	b	a	4	5
6	a	b	b	b	b	a	a	b	b	4	5
7	b	b	a	a	b	a	a	a	a	5	4
8	a	a	a	b	b	b	a	a	a	7	2
w	1	4	5	3	1	6	1	5	5	41	31

Massage

	71	17	13	53	15	31	43	12	37	c	w
R	b	a	a	b	b	a	a	b	b		
1	b	a	a	b	b	a	b	a	b	7	2
2	b	a	b	a	b	a	a	b	a	6	3
3	b	a	b	b	b	a	a	a	a	6	3
4	b	a	b	b	b	a	b	b	b	7	2
5	a	a	a	b	b	a	a	b	a	7	2
6	b	b	a	b	a	a	a	a	b	6	3
7	b	b	b	b	a	a	b	a	a	3	6
8	b	a	b	a	b	a	a	b	b	7	2
w	1	2	5	2	2	0	3	4	4	49	23

(Horizontal numbers: photo code; vertical numbers: viewers code; c: correct; w: wrong; r: rolfed)

Chi-Square for Swedish Massage: 16 = 0,1% (highly significant)
Chi-Square for Reiki: 2,77 = 10% (not significant – just a trend)
Chi-Square for Nothing: 36 = 0,01% (definitely significant)
Chi-Square for the whole: 45,37 = 0,001% (definitely significant)

Result no.1: Rolfers can in general recognize the photographic changes of a Rolfing session when confronted with the alternative between the photographs of a Rolfing session and a session of another method to the same person (significant).

Result no.2: Surprisingly enough Rolfers are least able to significantly distinguish between Rolfing session photographs and those taken after a session of Reiki. Whether this is due to the relaxating effect of Reiki, the caring touch, or the occult qualities cannot be deduced from statistics.

Nothing

	54	77	63	79	97	75	28	98	83	c	w
R	a	b	b	a	b	a	a	b	b	c	w
1	b	b	b	a	a	a	a	b	b	7	2
2	b	b	b	a	b	a	b	b	b	7	2
3	b	a	b	a	a	b	b	b	b	4	5
4	a	b	a	a	b	a	a	b	b	8	1
5	a	b	b	b	b	a	a	b	b	8	1
6	a	b	b	a	a	a	a	b	b	8	1
7	b	a	b	a	b	a	a	b	a	6	3
8	b	b	b	a	b	a	b	b	a	6	3
w	5	2	1	1	3	1	3	0	2	54	18

Result no.3: Rolfers can distinguish best when the alternative is between Rolfing pictures and those after no treatment.

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from these esoteric assertions, its simple physical reality is like this: in a session of Reiki the client lies on the table and the practitioner softly places his palms for several minutes at a time on all parts of the client's body. So without its metaphysics it is one hour of meditative body-awareness and relaxation under the caring attention and touch of another person. Finally, one of the four persons got a session of Nothing, i.e. after the pictures were marked «0» the person was asked to walk around the table and then the after pictures – marked «1» – were taken. Sometimes the model's hair was rumpled and the underwear displaced to create the outside marks of a Rolfing session.

Great care was taken to exclude any artificial variances because of faulty picture-taking. The camera was fixed at exactly the same spot and angle. The client's toe-nail of his or her big toe always was on the same spot so that the client always was in the same relative position to the camera. The clients always were instructed «to stand easy without any conscious pose». To make comparison easier a square-centimeter grid was used as a background.

Now look at one set of pictures after the next and decide whether the changes that you see – if you see any – between «0» and «1» look like the sort of changes that could be caused by the moment to moment fleeting changes in breathing and swaying of living organisms, but no more. Then probably you have a treatment of Nothing. Or do the changes look like those that might happen after an hour of relaxing, body-centered, soft and caring touching? Then your bet will be on Reiki. Or do they look like the kind of changes that are induced by one hour of vigorous massage to the soft tissue without special attention to the whole person? Then it might be Swedish Massage. Or do they look like the changes that you expect after a first session of Rolfing? Can you describe these expected changes? Is it: more length in front, separation of pelvis and thorax, lengthening in the hamstrings, more horizontality in the pelvis, and a more har-

monious pattern of breathing? These were the goals for the first session as taught to me in my basic training. If your definition of goals is different, we already have one important possible source why we might end up «recognizing» totally different pictures as being representative of Rolfing changes.

I urge you to really take the time and come to a decision on which set of pictures in your opinion is representative of which method. You can add or subtract weight to your decision by giving it a number between 1 and 6 for its degree of certainty (1= wild guess, 2= uncertain, 3= fairly certain, 4= certain, 5= very certain, 6= dead sure). What number do you give to your decisions? Please write your decision on a piece of paper before you continue in this text, otherwise you will miss the whole difficulty of such a decision and you will fail to understand the results of the project.

If you really did put yourself to the test, you will now be in the state of confusion and frustration that caused me to start this project. Imagine the state eight of your colleagues were in after they had to take such decisions on 36 sets of photographs: 9 after Rolfing, 9 after Reiki, 9 after Massage, and 9 after Nothing. Just to enable you to reconsider your own decision, let me give you the answers of your colleagues on these four, before I present to you the correct answers.

No. 35: Rolfing 6, Nothing 2, Nothing 4, Rolfing 4, Rolfing, Rolfing 2, Rolfing 5, Massage 2. The two Nothings came from two eminent Teachers of Rolfing, so don't be swayed too easily by the many Rolfings.
No. 51: Rolfing 5, Rolfing 6, Rolfing 5, blank, Massage 3, Massage or Reiki, Nothing 2.
No. 71: Nothing 3, Rolfing 3, Nothing 4, Rolfing 3, blank, Massage 3, Rolfing 5, Massage 2.
No. 54: Massage 2, Reiki 3, Nothing 4, Reiki 1, Rolfing, Nothing 3, Reiki or Massage, Reiki 1.

Naturally I knew that if the results of the project were a disaster, as I expected them to be, many Rolfers would try to evade the issue by saying: «Probably the Rolfer who gave the session was no good, or those who looked at the pictures were not experienced enough». Therefore I asked three different Rolfers to do the Rolfing sessions. The first three were given by an Advanced Rolfer, the second three by an Experienced Rolfer, and the third three by a Beginner. The same principle was applied in the selection of those who functioned as judges: 3 Teachers, 3 Advanced Rolfers, and 2 Beginners.

Table I lists the results in detail. Now you can see how you scored.

If you missed, here is a second chance: Look at the pictures of Series 2. This time the set-up obviously is different. You do not have to decide which of different persons got what, admittedly a very difficult thing to do. Now you see three pictures, one marked «0» for before, one marked «a» and one marked «b». One of the two pictures marked «a» or «b» was taken after a session of Reiki, Massage, or Nothing; the other after an additional first session of Rolfing. It is your job to decide which of the two was taken after one of the first three and which after Rolfing. Again you can give your decision a number between 1 and 6 for its degree of certainty. Do this now, please.

Probably you found this still difficult but much easier than the first test. I devised it because I was quite sure that everybody would fail on the first test. So I decided to treat all the 27 persons who had gotten Reiki, Swedish Massage, or Nothing in the first test with a free first session of Rolfing afterwards. They were Rolfed by two Beginners, the pictures were taken and arranged as «a» or «b» by the flip of a coin. These 27 sets of triple pictures were then sent out to about 20 European Rolfers of whom 8 responded in the course of three months. Here again – for suspense – compare your results with those of the 8 European Rolfers:

No. 13: a3, b6, b, b3, a3, a5, b4, b3.
No. 45: a3, a6, a, b2, a3, a4, a5, b4.
No. 61: a3, a4, b, a4, a4, a3, a5, a2.

Now – after you have reconsidered your decision – check for the results in Table II.

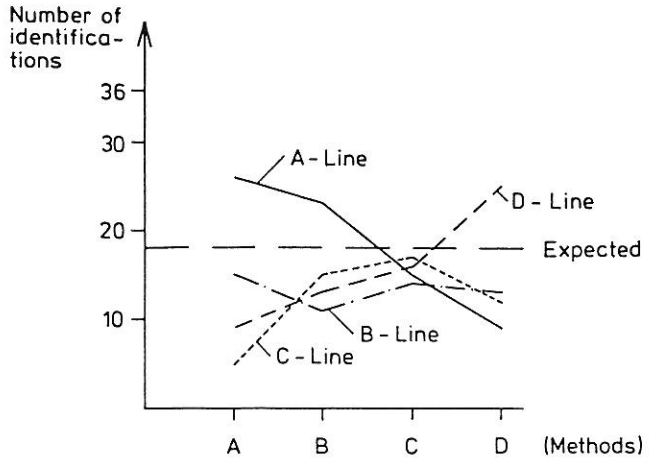
Table I shows the results of the first test. To find out whether you were right in your decision for example on number 35, you have to look for that number in the first row. Below it you then find what the eight judges thought that number 35 received. You can see that one judge only marked those he or she decided were Rolfed, another refused to differentiate between C (Massage) and B (Reiki). On the left border you can see whether the judges were Teachers, Advanced Rolfers, or Beginners. And in the block for method A (Rolfing) you can see in the top row whether the persons were Rolfed by an Advanced Rolfer, an Experienced Rolfer, or a Beginner.

Table II shows in the top rows whether «a» or «b» was correct for Rolfing and what method preceded the Rolfing. Below each code number the decisions of the viewers are listed. The bottom line lists how man decisions were wrong for each code number. On the right margin the numbers of correct and wrong decisions are listed for each viewer.

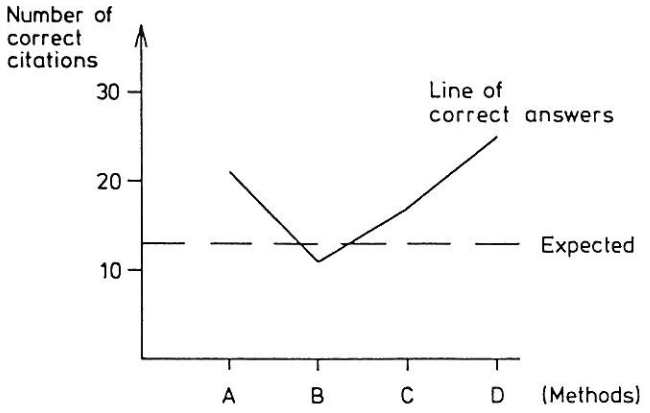
Interpretation of Results

First of all I dare say that my doubts were well justified. In Table I it can be seen that nine times pictures of persons who had only walked around a table were taken to be pictures of persons after a first Rolfing session. Table II shows even worse results: in the Nothing block where of the three pictures one showed the result of a first session of Rolfing and the other showed the result of a trip around the table in the very same person, 18 times Rolfers take the picture after the walk to be a representation of the changes of a Rolfing session! That is a lot and should warn us to be very careful in our interpretation of pictures. We can easily be fooled.

On the other hand I must admit that my worst expectations have not come true. They were that throughout all methods Rolfers would only «recognize» the correct pictures by sheer chance. This worst expectation is represented in Graph 1 by the horizontal dotted line (one quarter in every method: 72:4=18). But obviously the A-line, i.e. in each method the number of picture sets that were correctly (in A) or incorrectly (in B,C,D) identified as post-Rolfing pictures, does not follow that line of worst expectations. The same is true for the D-line, i.e. in each method the number of picture sets that were thought to be taken after a walk around the table (in A,B,C incorrectly, in D correctly). When A is highest,



Graph 1



Graph 2

D is lowest and the other way around. Since statistically there is only the chance of 1 out of 1000 that this is caused by chance only, it can be seen as proven: Rolfers – not *always* but generally – can distinguish the pictures after a first session of Rolfing from those after a walk around the table. Hurrah for that! – it *is* something we can build on.

The courses of the A-line and the D-line in Graph 1, however, suggest more than that. They show such a nice and steady descent from the maximum that they seem to imply: Rolfers can also distinguish pictures taken after Massage or Reiki from those taken after Rolfing and after Nothing. But as the dotted B- and C-lines show by their parallel course to the line of worst expectations, this is murky ground (only a 30% significance niveau, i.e. 30 out of 100 experiments would show the same result by chance only). Statistically it is only by the addition of the post-Nothing pictures that Rolfers show a significant (2,5% niveau) ability to distinguish Rolfing pictures from those of other methods. Without the Nothing sessions as an easy contrast, we look bad.

But Graph 1 holds another real surprise: Normally I would have thought that Swedish Massage is much more like Rolfing than Reiki and therefore I expected that post-Massage pictures would be more often taken to be post-Rolfing ones than pictures taken after Reiki, which knows no manipulation of tissue but only soft outside touches. But the opposite is true: Post-Reiki pictures are so often identified as post-Rolfing pictures that there is no statistically significant difference between the two, while post-Massage pictures are only identified as post-Rolfing pictures on the line of average expectancy. And strangely enough, pictures after Swedish Massage are more often taken to represent a treatment of Nothing than post-Reiki pictures, although compared to Swedish Massage Reiki seems much more like nothing.

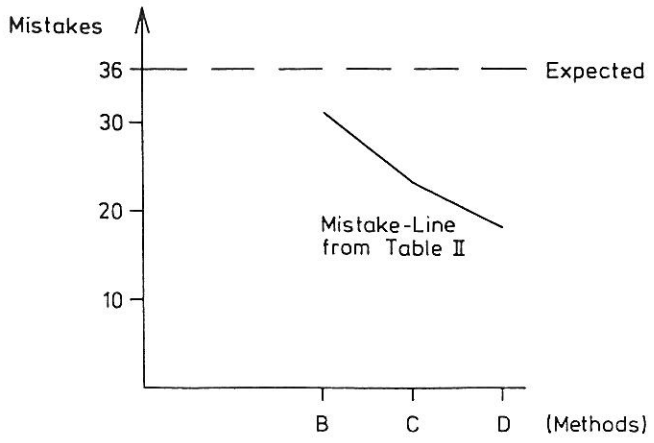
Looking at the line of correct answers in Graph 2, you can see the other side of the same puzzling story: Rolfers have most difficulty in identifying correctly the post-Reiki pictures. Again I would have expected the post-Massage pictures to cause the greatest difficulties and to be below the expected line of equal distribution (lower than in Graph 1 because of less responses to B,C, and D).

Graph 3 shows the results of Table II: The Mistake Line shows how often Rolfers were wrong when they had to decide whether «a» or «b» were the pictures of a person taken after a Rolfing session. As I expected, the results are much more encouraging than in Table I. The statistical significance in the ability to distinguish post-Rolfing pictures from pictures after the other three methods is much higher (0,001%).

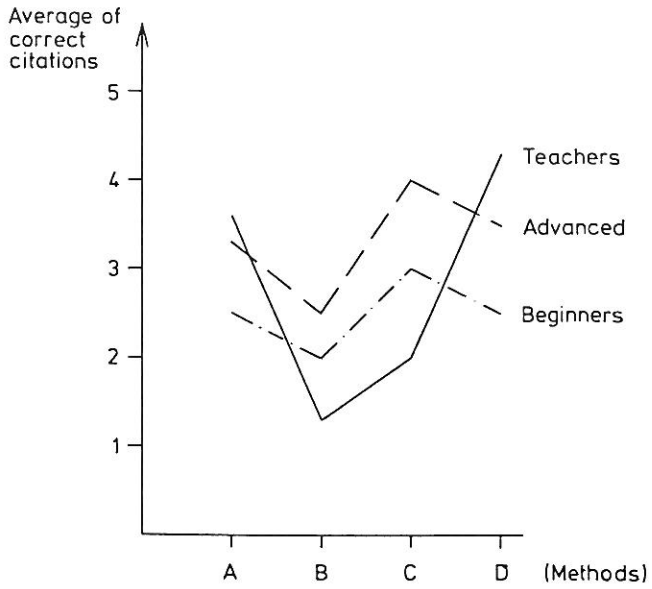
But again it is clearly the contrasting post-Nothing pictures which make the difference (0,01%). Post-Massage pictures still are significantly (0,1%) distinguished, but the post-Reiki pictures are too close to the expected line of random distribution to be statistically significant (10%).

This naturally underlines the surprising result of Table I: It is hardest for Rolfers to distinguish pictures taken after a session of Reiki from pictures taken after a first session of Rolfing! This is true not only when different persons are looked at who got the different treatments but also when the two treatments are given to one and the same person, first Reiki, then Rolfing.

It is selfevident that statistics cannot explain this surprising result. Since we have no information on what the judges were looking for in the pictures, we can only speculate what caused them to see so frequently the changes they expect in post-Rolfing pictures in photographs of persons who had Reiki instead. Clearly it would be wrong to conclude from this that Reiki and Rolfing produce similar changes. The statistics only indicate that Rolfers cannot clearly distinguish these changes on photographs. This may be due to an insufficient clarity in the definition of changes expected from a first session of Rolfing. If such a definition is as vague as «creating lift», «a better flow of energy», «more liveliness», or other categories like this without a detailed description of the expected *structural* changes, then indeed it is not surprising that the effects of the two seem alike. Probably any good centering meditation would create the same effects, or any other method with such caring bodily attention common to both



Graph 3



Graph 4

Rolfing and Reiki. It is the *structural* change that makes Rolfing special and if these specific structural changes are not in the center of the Rolfing sessions and of the observation of the judges alike, the results of a Rolfing session may understandably look much like those of a Reiki session.

This has to be tested in a follow-up study. Until then the practitioners of Reiki will use this study to claim that their work creates the same results as Rolfing by the force of the Universal Life Energy or some other wondrous miracle. Others may claim that the main effect of Rolfing is caused by the caring attention and less by the direct tissue manipulation – a legitimate speculation on the basis of the statistical results of this study.

But already now there are strong indications that the clear definition of structural changes is the crux of the matter. Naturally I was not able to remember in the second test which of the two, «a» or «b», had been the Rolfing sessions. Yet with the clear definitions of the goals of the first session in mind and knowing that the practitioners who gave the 27 sessions shared these goals I was able to correctly identify 25 of the 27 sessions. And even better: when I gave the «a» and «b» pictures to a non-Rolfer and told her to look for more length in front and in the hamstrings and a better separation of pelvis and thorax (the goals that the two practitioners who gave the sessions had worked for), she quickly and correctly identified 24 of the 27 sets of pictures. That is by far better than any of the Rolfers did who participated in the project!

Graph 4 gives some support to this interpretation. It shows the average of correct answers for Teachers, Advanced, and Beginning Rolfers in Table I. An average had to be taken because some responded only to some of the methods. I have shown before that in the areas of Reiki and Massage guessing prevails and the results lie in the area of random distribution. In this area (B and C) of guessing Teachers score low. In the structurally decisive areas of Rolfing and Nothing Teachers score above Advanced Rolfers and these above Beginners. For me this is an important result, for it encourages my hopes that analyzing photographs is something that can be learned by experience and exercise.

Seen from this perspective, the project results could be interpreted as demonstrating the lack of definition and consensus of what the expected changes of a first session of Rolfing should be. For, evidently one can only recognize something that one already consciously knows and looks for.

Seen this way, the results of this project reflect much less on the question whether photographs can be an instrument for judging what works. The important result is to realize the lack of definition and consensus on what changes should be looked for. It is the murkiness of our goals that makes it possible for the effects of a first session of Rolfing to be mixed up with the effects of something like Reiki, which is so fundamentally different from Rolfing in all respects except «good intentions».

Therefore, in conclusion, the question: «How can we know what works?» – finds a surprising answer: We first have to define and describe very clearly and in detail how that which we want to change should look afterwards, then and only then photographs may be a useful tool to identify whether these changes have been brought about or not. Thus this project underlines the necessity of the work the authors of this journal have undertaken to do.

Postscriptum

There were some other less important results which are more of a curiosity than of central relevance. One is the widespread expectation that sessions you give away for free show not as good results as those that are paid for. The statistics of this project point to the opposite: of the paid sessions only 10 out of 40 possible identifications were made, while of the free sessions 16 out of 32 correct identifications were made. But this has to do with the other curious fact: I expected most correct identifications for the sessions the Advanced Rolfer gave, then for those of the Experienced Rolfer, and finally for the Beginner. The opposite turned out to be the case. Each had 24 possible identifications. Of these the Begin-

ner got 14, the Experienced Rolfer 9, and the Advanced Rolfer 3. Those who want to conclude from this on the quality of these Rolfers I want to remind that the number of correct identifications probably shows more about a consensus on the goals of a session then on the quality of the work or the extent of changes. Only after such a consensus is established among those who give the sessions and those who judge the pictures can the numbers of correct identifications reflect on the success or failure of sessions.

Finally, I want to express my thanks to all those who participated in this little project:
36 volunteers, A. Boeckh for the statistical evaluation of Table I, Hilde Feldweg, and the following Rolfers for doing the sessions or being judges: Cordelia Alber-Klein, Manuela Brinkmann-Hartmann, Harvey Burns, Lynne Christianson, Hans Diepold, Hans Flury, Heidrun Gelenk-Borst, Oskar Holzberg, Seamus Keane, Peter Melchior, Tom Myers, Luigi Negro, Stanley Rosenberg, Michael Salveson, Robert Schleip, Beverly Silverman, Jan Sultan, Bernadette van Boxel, Thomas Walser.

Peter Schwind and Sebastian Schmidinger

The Temporo-Mandibular Joint in the Combined View of a Dentist and a Rolfer

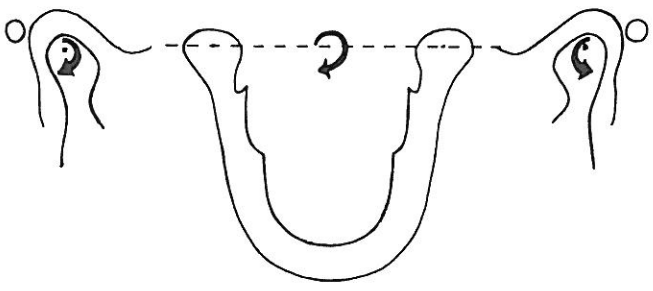
Dentistry and Structural Integration approach the TMJ complex from quite different perspectives: While dentists focus primarily on pathology and the painful symptoms of this special area, Structural Integration considers the TMJ to be *one* unit which is interrelated by connective tissue components with *all* other segments of the body. Structural Integration aims for balance of the mandibula in relationship to the cranium, the neck, and the dynamics of the whole body. This intention is frequently – even before we enter the pathological field – difficult to pursue as soon as the TMJ is in trouble. For dentists pain in the TMJ is a symptom of functional disorders in the myofascial system of the masticatory muscles. It has more and more been realized that the pain is often accompanied by irritations in the cranial, neck, and thoracic areas of the body. Such disorders may be causing structural degenerative changes, especially in the elastic cartilaginous parts, which result in additional functional problems. How can Structural Integration achieve its goals in a situation like that? What should a Rolfer know about the basic interventions a dentist carries out? And what can a dentist expect practically from the work done by a Rolfer around the TMJ?

This article aims at providing the Rolfer with simple diagnostic auxiliaries used in dentistry so that he is able to find a basic orientation in this complex structural field. And the eye of the dentist might receive insight into the structural analysis and manipulative potential of Structural Integration.

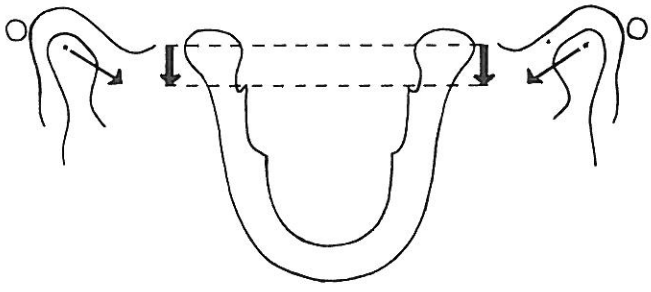
An understanding of the functional anatomy of the masticatory organ, and especially of the TMJ, is made difficult by the fact that the mandibula is «attached» to both mandibular joints in which the condyloid processes of the mandibula describe either consistent and synchronized or inconsistent and asynchronized curves in space during any kind of movement conceivable. Both joints are pivot and ball-and-socket joints at the same time.

During movement around the hinge axis (up to 12 mm),

Ill.1 Movement around the hinge axis



Ill.2 Protrusion on both sides



the condyle remains in the joint cavity; in all other movements one of the two condyles, or both, migrate toward the lower front direction, more or less at an angle to the sagittal plane. If the joint is worn out, an immediate sideshift of the condylus can be observed in case of mandibular laterotrusions and latero-protrusions. In a position of rest, the mandibula is kept in opposition to gravity during what is called free-way space, i.e. with upright posture a continuous activity of the masticatory muscles is necessary.

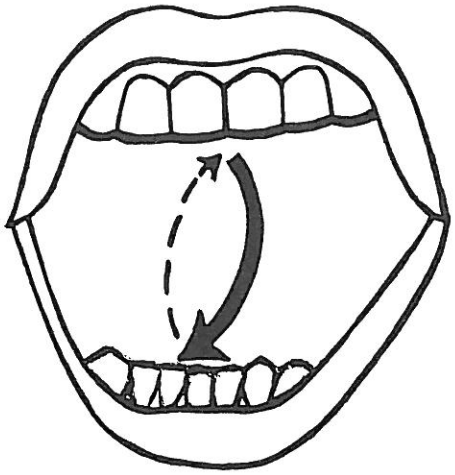
The delicate structure of the TMJ corresponds to the double function of the pivot and ball-and-socket joint and is characterized by a great deal of elasticity, especially in the dorsal part.

Dentists start with their anamnesis in the area where pain can be observed: they try to trace the nature and degree of the pain in a context of time and space. Important auxiliaries they use are X-ray pictures (showing joints with mouth open and closed) in order to be able to discriminate functional against structural changes and in order to recognize pathological factors such as tumors or systemic and chronic degenerative diseases in the mandibular and cranial areas.

In our analysis we could, of course, follow either the structural approach of Rolfing or the function-oriented method used by dentists. In this paper the authors try to combine both perspectives:

I. When and where can pain be observed:
   1. when the mouth is opened
   2. when the mouth is closed
   3. during extended periods of mastication
   4. in time correlation with other diseases

II. What kind of disturbances in the structural pattern can be observed:
   1. Limitation of oral aperture (usual range between 48-60 mm)
   2. Deviations from middle-line during opening or closing of mouth (Ill.5)
   3. Distinct and direct side-movement of the condyloid processes of the mandibula during immediate laterotrusion
   4. Clicking of joints at the beginning, during, or at the end of the functional movement



Ill.5

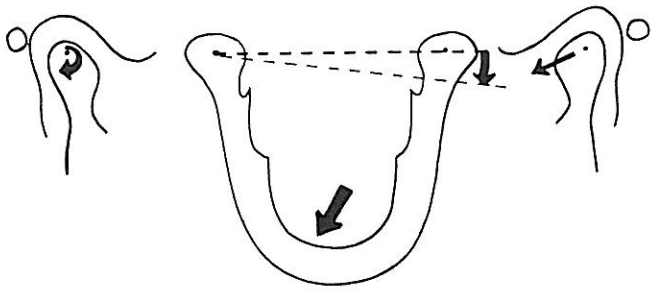
What are the main factors contributing to the conditions mentioned above?

Dentistry
1. Chronic degenerative diseases (osteoarthrosis) and systemic diseases such as rheumathoid arthritis and diabetes.
2. Cranial, cervical, and mandibular traumata.
3. Malocclusion and disturbed articulation (logophasia) due to position of teeth.

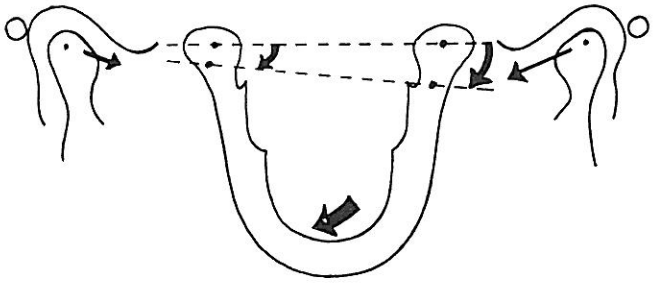
Rolfing
4. Overstrain resulting from stress, especially due to parafunctions at night such as pressing and grinding of teeth against each other.
5. General structural deviations from the normal state; intra- and intersegmental (cervical, thoracic, and lumbar spines, pelvis, and legs down to the foot).

While it is rather easy to explain the causes described under point 1 and 2 by way of anamnesis, a special diagnostic method is required for point 3 and 4 with which it is possible to recognize differences between the muscularly-guided joint position and the teeth-guided joint position and the mandibular body respectively.

Ill.3 Laterotrusion (right side)



Ill.4 Latero-protrusion



Test referring to point 3

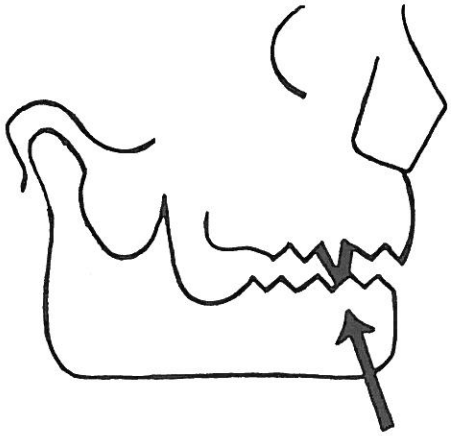
a) Is the occlusion correct?
The difference between muscularly-guided and teeth-guided movement of the joints can be found out without difficulty: while palpating the joint areas with the index fingers, we open our mouth slightly (10-12 mm). Then we start to close until we can feel the first contact of opposing teeth, and we finally proceed from there to a firm occlusion, maximal intercuspidation (Ill.6 and 7).
Big differences (› 5 mm) between both positions are of little relevance in the muscularly-guided phase *in the daytime* (only during swallowing do the teeth touch each other, not during mastication), *during sleep*, however, they may cause considerable parafunctions, especially in dream phases.
The presence and degree of this difference is easy to diagnose using what is called Dawson's grip (Ill.8): Take position behind the sitting patient and guide with both hands but without force (!) the mandibula in the hinge-joint axis position with delicate opening and closing movements (no contact of teeth). In further closing guide to the first contact of teeth, then until maximal intercuspidation. This may result in a slight or considerable slipping towards the ventral plane. Also an excursion to the lateral plane may occur. We might find a combination of both as well. As a consequence, a compression or luxation of the discus is likely to occur.
A trained ear is also capable of diagnosing the successive sounds of the early-contact encounters and of contrasting them with a «dull» contact situation of the «good» occlusion. In a situation of a longer period of missing teeth in the side-teeth area or with full dentures being too low, the capitulum may be pressed towards the upper rear (Ill.9).

b) Is the articulation, i.e. the chewing movement, in order?
Definition of terms:
Working side is the side of the jaw towards which the mandibula is moving and where it carries out grinding movements. This means that during right mandibular side-shift the right side is the working side.
Balance side is the term for the opposite side, i.e. during right side-shift this side is the left side of the jaw.
In the normal constellation, only the incisors and canines, and maybe also the cusps of the molars of the working side, touch each other. This means that the two condyles and one incisor or canine form together a stable triangle. (Seen from a neuromuscular view, this results in a minimization of masticatory power.) Now, if any of the molars is in the way during front or side shift, this tooth is either mobile or abrased, or the ligaments of the joint are overstrained (Ill.10).
It is easy to find out whether this is the case or not by putting a thin foil between the molars of the *balance side*. If, during movement towards the working side, the foil sticks to the teeth at the balance side, we have reason to believe that there are articulation disturbances.
How can we diagnose parafunctions? Apart from habitual activities such as thumb-sucking, pipe-smoking, excessive mastication of chewing gum, etc., it is primarily pressing and grinding of teeth during sleep we mean when talking about parafunctions. The reasons may be insufficient occlusion and articulation, lack of minerals (magnesium $^{++}$), and stress or a combination of these factors.
Apparent features apart from anamnestic considerations (lockjaw and sensation of pressure in the morning) are especially an early wear and tear of the occlusal surfaces (abrasion facettes), but also a gum recession or loosening of teeth.

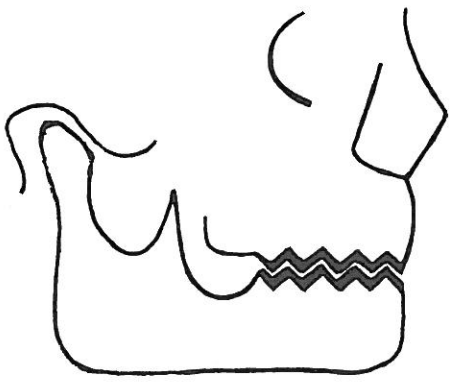
Reference to Point 3 and 4, Therapeutic Work in Dentistry

Dental therapy attempts to eliminate occlusal and articulation disturbances by way of abraiding precontacts and balance contacts. This technique is, however, limited owing to the thickness of the enamel layers. Other repair works include replacement of defective fillings, crowns, and bridges in the occlusal area aiming for balance of the mandibular joints. In cases of severe disturbances the balancing of occlusive and articulation defects is initiated by applying an occlusal splint used at night, with the occlusive and articulation pattern being tailored for individual needs. This plate is designed to relieve both the mandibular joints and the apparatus the teeth are embedded in.

Ill.6 Muscle position (centric relationship)



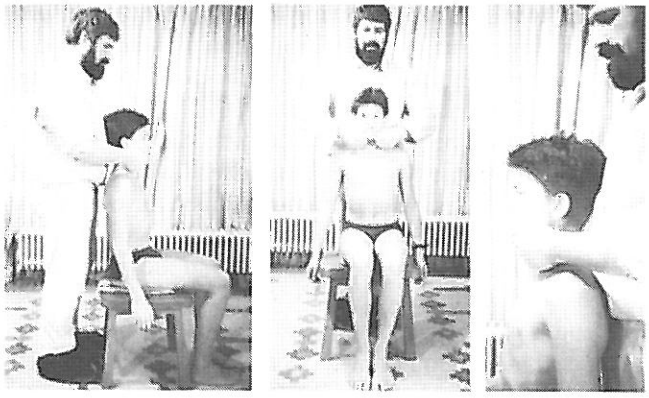
Ill.7 Maximum intercuspidation after shifting forward at the first (pre-)contact (habitual relationship)



This splint feigns a muscularly normal mandibular position in the hinge-joint axis and, by way of minimal pre-extension, results in a reduction of muscle tonus, especially in parafunctional movements carried out *during sleep*. And, at the same time, it is quite easy with such a plate to provide for a power-reduction of the frontal canine guidance.

It is, however, not possible to eliminate «abnormal» occlusion and articulation patterns occurring during the day-time with this device[1], neither can it remedy already manifest transformations of the bone and connective tissue systems.

The discussion of this dilemma leads us to point 5 («General structural deviations ...»). Before we take a look at the functional anatomy of the masticatory muscles and the mandibular joint, let us recapitulate some basic principles of Structural Integration.



Ill.8 «Dawson's grip»

Excursion: Standard Structural Integration of the Craniomandibular Relationship

The traditional concept of Structural Integration emphasizes the relationship of segments, the relationship of shoulder-girdle, neck, and cranium. The mandible is seen as an additional component which can only be balanced on the basis of balance accomplished in the human structure as a whole. It is known that the founder of the work used a simple metaphor to define the spatial adequacy between cervical spine and cranium by demanding that the cranium be treated as a kind of «extra-vertebra» on top of the spinal column. According to this image, the cranium would find its position relative to the curvatures of the whole spine and allow for mobility between the axis-atlas-cranial base.

This general guideline has been supplemented by a more specific analysis of fascial strain phenomena around the critical area: Is the jaw bound to the cranium? Is the jaw bound to the neck or even downwards to the shoulder-girdle? The answers to these and similar questions describe the geometrical framework of the craniomandibular relationship as a consequence of rigid tensional patterns. And the work done in the standard sessions of Structural Integration guarantees that the tensional abnormity gets somewhat eased, and we arrive at least at a certain order of spatial relationship of the cranium and the other segments of the body.

Frequently there is no detailed movement analysis included in the spatial («static») analysis which would allow the practitioner to evaluate the TMJ activity from a functional standpoint. This situation is in contradiction at least with an episode at the starting point of the discipline: It was the observation of movement dysfunction and not static analysis which led to intraoral manipulation[2].

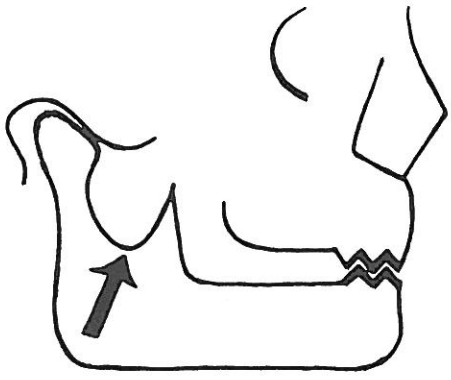
Traditionally, the intraoral work is limited to one session. There is some structural logic in the fact that this session is placed at the end of the organizational journey through the body: The more subtle junctions of neck-cranium-mandible require a foundation coming from balance between the more solid segments, especially from leg-pelvis relationships. And the psychological implications, which are often found around this most expressive part of our body, require a certain level of clear interaction that has to be established prior to entering the critical area.

The limitation of intraoral manipulation to one session

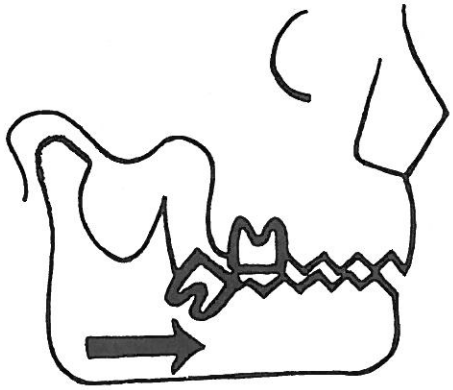
[1] This is where Garliner's myofunctional therapy comes in.

[2] The founder of Structural Integration «extrapolated» the work done on external muscles to the internal construction of the jaw-neck relationship. Her starting point was the observation of a dysfunctional movement pattern of a singer who couldn't open his mouth symmetrically (see «Ida Rolf Talks about Rolfing and Physical Reality», p. 155).

Ill.9 Compression caused by lost teeth



Ill.10



certainly works in cases showing «normal» movement patterns. However, this limits additional trauma-searching efficiency or just doesn't deal with a specific case as soon as significant TMJ imbalance is involved.

Recently it has been discussed that the standard work of Structural Integration should comprehend a more careful evaluation of mandibular structures[3]. Such an evaluation could lead to an expanded map of standard manipulation. The prevertebral structures of the neck and the floor of the mouth might be addressed as early as the fourth standard session and a part of the TMJ in the fifth standard session. There are indeed some anatomical considerations which might support this strategy: The standard fourth hour creates a lift deep inside the body. If this lift is manifest through the ankle and the knee and travels up to the pelvic floor and the longitudinal ligament to the front of the spinal column, there will be an area of «critical transition» around the upper cervical vertebrae and the cranial base. And more than that, if the area lacks resilience, the lift coming from below will increase compression around the atlanto-occipital membrane and rotations of vertebral bodies appear to be more obvious.

Certainly some cases will be resolved easily by applying manipulation to the lateral compartments of the neck. But this approach mainly influences the position of the middle cervicals, and even quick action around atlas and axis rarely affects the «inner dimension» of the neck.

Of course, this «inner dimension» is more or less a principle of «form» which is not identical with the combination of anatomical elements. Let's see whether we find a more efficient way of manipulation if we try to translate the form into anatomical details.

Ill.11 shows some of the inner elements of the neck. As soon as all the external compartments of the neck have been balanced, there are mainly the connections through the hyoid ruling strain across cervical and craniomandibular areas. Seen from a muscular perspective, it is especially the m. digastricus with its anterior and posterior part that binds the inferior part of the mandible to the mastoid notch of the temporal bone. Seen from a «connective tissue perspective», it is the fascial differentiation between mylohyoideus and digastricus and especially the origin of the digastricus at the fossa digastrica mandibulae which limit the range of movement between the floor of the mouth and the occiput.

Some Aspects of Structural Analysis

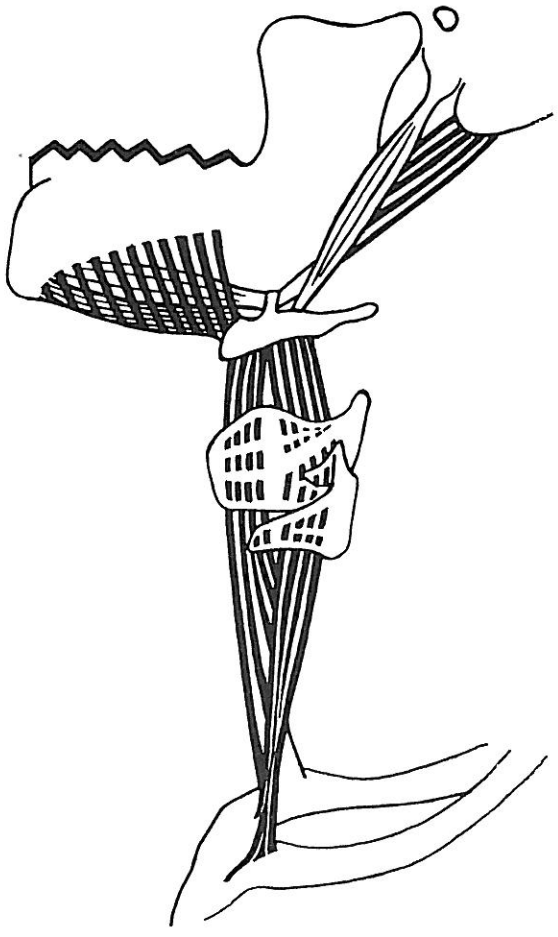
Due to its special importance as a suspended hinge, the temporo-mandibular junction responds to any random pattern of the upper pole of the body. Before movement is tested, a «static» analysis of the segmental alignment should be made. This is especially true for the lateral alignment of shoulder-girdle, neck, and cranium. Practical observation has shown that a structural («chronic») fixation of the head in anteriority will reduce the range of opening of the TMJ. This seems to be true for the opposite pattern, the hyperextended neck, as well. The analysis of the lateral alignment leads to the description of intersegmental strain patterns. Which layers of the shoulder-girdle, of the arms, the neck, and the cranium shape the fixation of a structural deviation? How are those layers related to the whole structure of the body, especially to the pelvis and the legs? How are the curvatures of the cervical and lumbar spines related to each other (Ill.12)?

The analysis of the lateral views is followed by cautious observation of the upper pole from the front. This view is secondary for the recognition of intersegmental strain patterns. However, it provides some information on side-shifts in the relationship of neck, shoulder-girdle, and of the cranium-neck relation (Ill.13).

For the trained eye this frontal analysis provides already some information about the movement patterns around the TMJ by recognition of the symmetrical or asymmetrical suspension of the jaw (Ill.14).

We suggest to do a dorsal analysis as the next step. The dorsal view gives information about the role of the back for the temporo-mandibular junction. How are those intersegmental strain patterns, which we have seen from the sides and the front, rooted in the back, how does the back contribute to an overall compensation? Sideshifts within cranium-neck or neck-thorax are usually accompanied by thoracic rotations or pelvic torsions/rotations. Deviations of the lateral line are accompanied by disturbances in the inner construction of the pelvis and the dorsum. In both cases the stabilizing capacity of the legs (leg-pelvis relationship, leg-back relationship) should not be ignored.

Ill.11 The «inner dimension» of the jaw-neck relationship (based on Rauber/Kopsch)



[3] We are referring to a workshop taught by Jan Sultan and Peter Schwind in Munich in spring 1985.

To get more into details, we continue with an evaluation of *intrasegmental* strain patterns. We focus on those layers which have their origin in, and end within, one segment of the body and look at the shape of bony structures. Only part of this analysis can be done visually, a good deal has to be explored by palpation. This is relevant for the intraoral elements mentioned above: especially the anterior venter of the digastricus, the whole condition of the floor of the mouth, and the atlanto-occipital junction. We have the basic structural components at our disposal now. On this basis we begin with the observation of movement.

Seen from the front, we observe whether the capacity of opening (a) is regular. Secondly we evaluate whether there is deviation from the middle line in opening and closing (b). To understand the normal and abnormal situation we have to test movement function according to the scheme of Ill.1-4.

Some Aspects of Functional Anatomy

In case of a reduced capacity of opening (a) we frequently find a lack of resilience of the connective tissue of both neck and cranium. This is true for the galea aponeurotica and for the lamina of the neck, especially for those connective fibers reaching down to the posterior mediastinal cavity of the thorax. Apart from the obvious meaning of the masseter and buccinator, it is the temporal muscle which plays a significant role[4].

We have called the special situation of the TMJ a «suspended hinge». The temporalis contributes largely to the structural quality of this hinge because of the activity of its posterior part which stabilizes the jaw in a position of rest. If opening is reduced, there are two main restrictions: either the lateral pterygoid and its junction with the discus do not allow the second phase of opening (after phase one – minimum opening – the discus has to move forward), or the restrictions of the fascia temporalis bind the whole jaw to the cranium so intensively that movement is restricted[5].

In this context we must not forget that one of the main «muscles» that opens the jaw is gravity. The function of the temporalis during (a) is to allow gravitational impact on the jaw through extension. This is especially significant as the temporalis rules both macro- and microstructure of the TMJ. The temporalis muscle connects at its lowest part with the fascia of the m. buccinator, with the temporalis being the strongest muscle of mastication (macrostructure), and deep inside the temporalis can connect the TMJ to the discus articularis (microstructure). This double determination of the temporalis is the basis of its unique function.

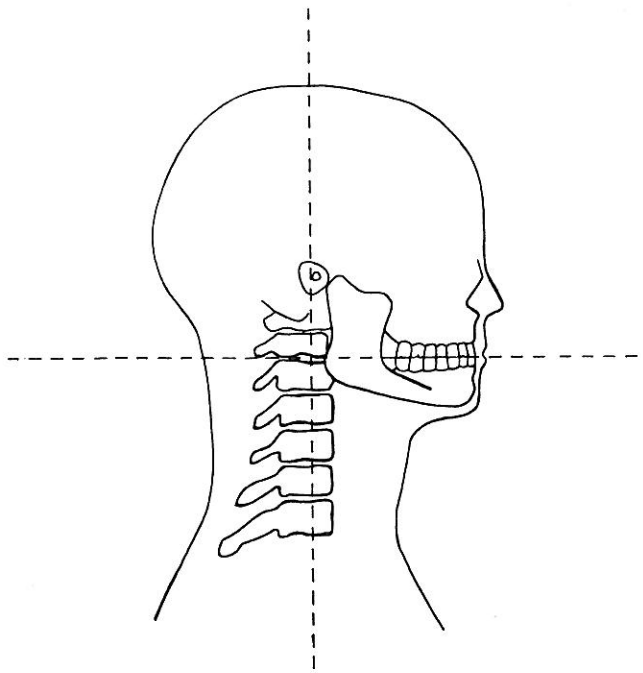
In case of side deviation (b) in opening and closing we have to observe the activity of the lateral pterygoids carefully.

Side deviations as a movement pattern have their proper place during the grinding activities of the teeth. The pattern means that the caput mandibulae and the discus articularis are moved forward only on one side while the other side is kept back and rotates around a vertical line. This is functionally meaningful in certain chewing activities because it allows the molars to shift sidewards a little less than their actual breadth. As a permanent pattern of opening and closing movements it shifts the phenomenon of grinding movements to the inside of the TMJ and creates a vicious circle of

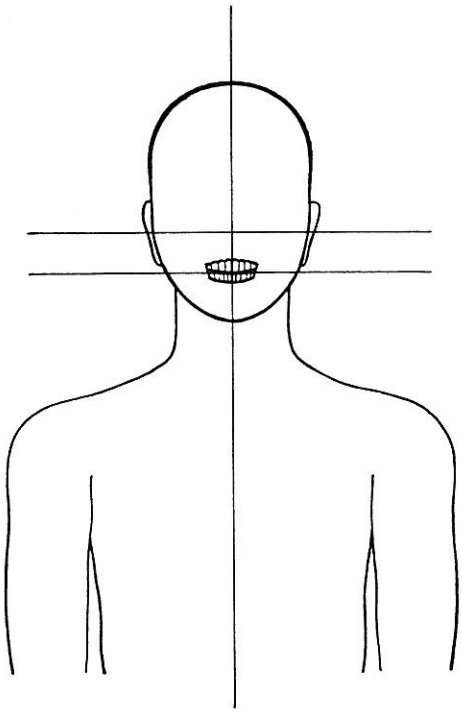
[4] In osteopathic theory the temporal bone and its movement within the cranial system is considered to be the keystone to resolve TMJ dysfunction.

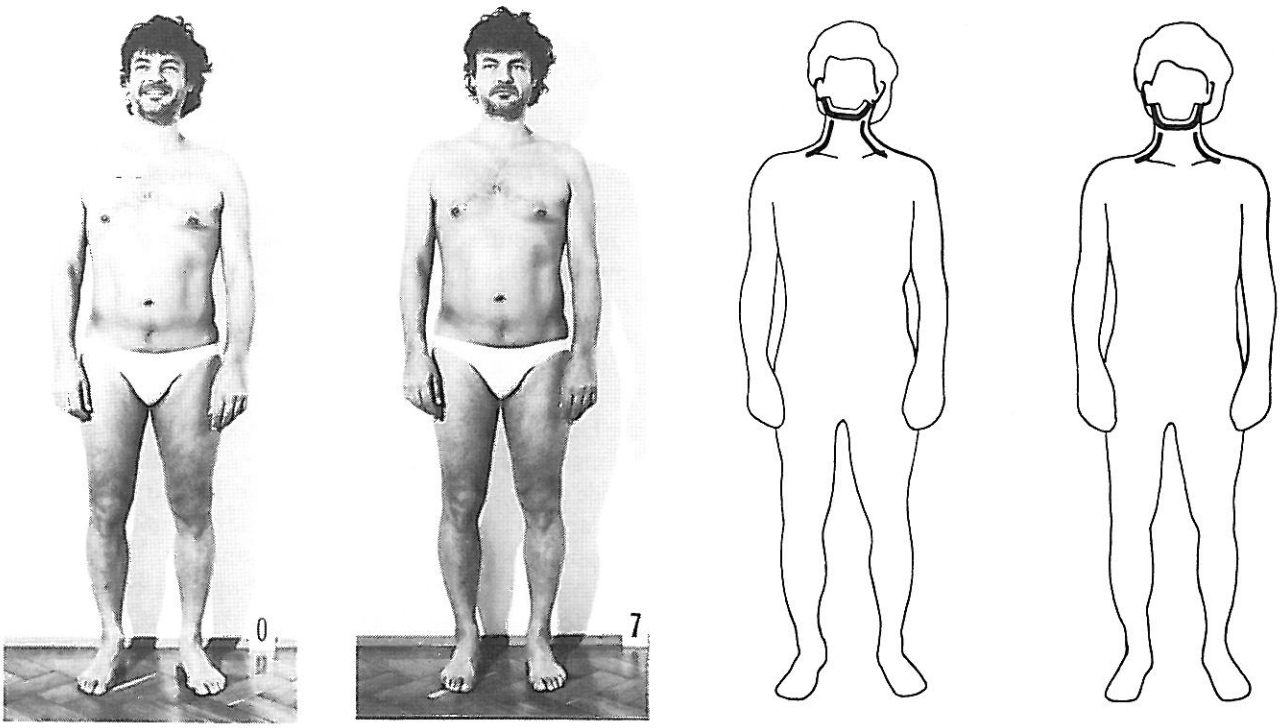
[5] The m. temporalis is attached to the cranial bone and the inside of the temporal fascia.

Ill.12 Vertebral balance related to occlusion



Ill.13





Ill.14 Minimal facial expression gives information about asymmetrical suspension of the jaws

strain in ligamentous parts of the capsule and dysfunction of movement[6].

For a proper analysis we have to look at the joint capsule in greater detail. In a balanced TMJ, the joint capsules allow on both sides sliding movements internally and externally. The internal movement articulates by the discus articularis, the external movement by the lateral temporomandibular ligament. Internal and external components contribute to shape one unit. The posterior part of the joint capsule adheres to the «bilamina» part of the discus, the lateral temporomandibular ligament is contiguous to the external part of the lateral layers of the capsule.

Traditionally, the side deviation (b) has been interpreted as an asynchronous activity of the lateral pterygoids on the two sides of the jaw. We speculate that this asynchronicity is based on strain patterns around the joint capsule, i.e. the lateral temporomandibular ligament and the part of the capsule which is connected to the posterior part of the upper head of the lateral pterygoid.

Ill.15 illustrates why the lateral pterygoid can be used as a main entrance to the inner construction of the TMJ during manipulation. The fascial layers which enwrap the lateral pterygoid are the main element to influence side deviations during opening and closing of the jaw.

Before we enter into discussing the basic principles of this manipulation, we have to face the question of the different space curves the jaw shows in opening and closing. Quite often they appear to be similar but are in fact different, the opening curve takes on another form than the closing curve. This phenomenon can be explained by the antagonistic action of the two heads of the lateral pterygoid: the inferior head of the lateral pterygoid flexes during opening of the mouth, while the superior head flexes in closing.

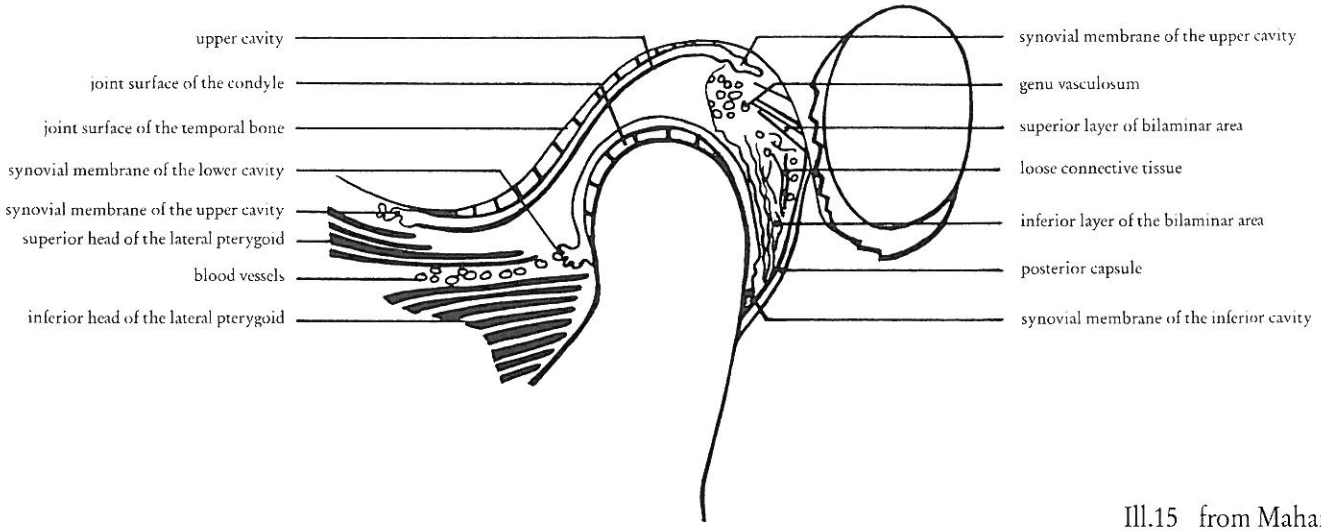
How can the complexity of the anatomical map contribute to the practical territory of manipulation?

Aspects of Manipulation

We have mentioned that standard work of Structural Integration arrives at a certain spatial order of shoulder-girdle, neck, cranial, and mandibular relationships. A good deal of the results is based on the manipulation of the neck. And these results imply improvement of opening capacity. It is often not taken into account that it is not only the mandible which moves downward and forward during the opening process: in drinking and eating activities the cranium tilts upwards and backwards while the mandible sinks. And the musculature of the neck acts as an indirect opener of the jaw, using the atlanto-occipital junction as a hinge. That's why the resilience of all the compartments of the neck is an indicator for the capacity of jaw opening. In this context we can understand why the flexibility of the atlanto-occipital membrane plays such an important role. This membrane acts as a constitutive element in the hinge function and relates downward with its anterior part to the superior portion of the longitudinal ligament.

Practitioners are usually happy with the results in the field of the neck and so are the clients if the work is done elegantly. This is not true for the more complex problem of disturbed movement patterns apparent in side deviation. It is

[6] This situation often includes a clicking of the joint.



Ill.15 from Mahan

simple to get quantitative improvement in opening, but it is not simple at all to get the two sides of the jaw balanced in movement. The dilemma starts as soon as we arrive at the layers around the hyoid bone. It is hard to develop any sort of «standard» approach because the tissue arrangements seem to be different in this area[7]. And the dilemma continues when we look at the inner construction of the TMJ because the deepest elements around the joint capsule are difficult to approach.

What can we do when opening and closing show dysfunctional sideshifts? We suggest that the TMJ is permanently observed in its relationship to the neck during manipulation. If the problem is rooted inside the TMJ, the neck has to compensate the movement restriction of the joint by activation of the anterior components. The more one side of the TMJ is under strain the more active the infrahyoid musculature has to be during opening. The authors of this article have observed cases with unilateral restrictions shifting the muscle activity during opening toward the extrinsic layers to such an extent that the platysma acted as the most active part to pull the jaw downwards against the forces of strain in the temporal fascia and around the TMJ. In situations like that all the compensations of the neck have to be taken out before we focus on the restrictions of the TMJ itself. We have to observe through palpation how the cervical fascia connects with the fascia of individual muscles. We have to watch out for details like the connection of the angular band of the cervical fascia with the masseteric fascia, and we test the resilience in the vestibule of the mouth around the depressor labii inferioris and the mentalis muscle. And apart from details we observe how the manipulation of the horizontal tissues (such as the diaphragma oris, the palate, and the atlanto-occipital membrane) influences the tensional forces in other horizontal layers (thoracic inlet, respiratory and pelvic diaphragms).

There is a clear indication whether the compensations in the neck are resolved. We test the neck during turning to the sides; the moment of balance is characterized by resilience in the external muscles; the external muscles only *accompany* the movement which is *guided* by intrinsic muscles. In our opinion the direct approach of the TMJ is to be based on this balance.

In order to arrive at a final correction of the side deviation, the fascial layers enwrapping the lateral pterygoids need to be manipulated. We look at the connection with the posterior part of the capsule; the lateral pterygoid is our only direct entrance to the discus because the upper portion of the muscle connects directly with the discus. In Benninghoff's book the discus is called «Sehnenplatte» of the superior head of the lateral pterygoid[8].

In differentiating the two heads of the lateral pterygoid, we influence the most significant muscle of the TMJ. It is not only this muscle's unique capacity to extend the inner dimension of the joint, it is also involved in all movements of the TMJ as a balancing and correcting element.

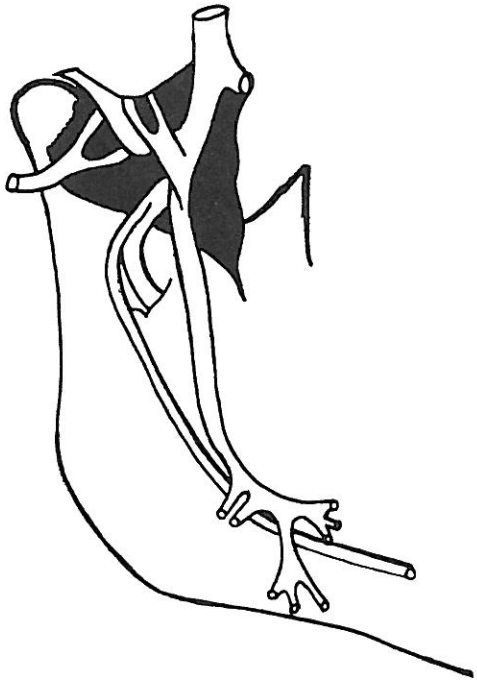
The question remains how to apply manipulation to layers that adhere so tightly to the microstructure of the joint. Frequently, the critical layers can not be touched directly because the junction is too narrow to allow direct palpation. We suggest to use a sort of «wedge-technique». The practitioner carefully positions his/her finger as high as possible towards the posterior part of the joint. The opening of the client's mouth should be reduced as soon as this spot is found. Then the client is asked to close his teeth while the practitioner's finger acts as a «wedge», which indirectly influences the strain in the posterior part of the capsule.

It is important to be aware that this kind of manipulation has to be applied in different modes on both sides of the TMJ respecting the difference of strain found on those sides. Bilateral application of the same manipulation usually leads to quantitative improvement in opening but not to qualitative balance on the sides. We believe that balance accompanied by modest opening capacity is of higher value for the long term development of the joint than a maximum opening accompanied by a side deviation.

And it is important to avoid unnecessary irritations in this delicate area. The nervus lingualis and the nervus alveolaris inferior cross the lateral pterygoid vertically. To avoid pres-

[7] An example of highly individual arrangements is the digastric muscle, which is functionally important but missing in some people with its anterior venter.

[8] Benninghoff, Anatomie I, p. 530



Ill.16 Left side of the jaw seen from lingual: after the medial pterygoid has been removed we find the spatial relationship between the nervus lingualis, nervus alveolaris, and the lateral pterygoid muscle (the muscle fibers are darkened in the drawing)

sure on these nerves, the practitioner has to find contact through palpating a little bit posterior and superior to the intersection of nerves and muscles (Ill.16).

Conclusion: Some Remarks on Technical Theory

Before he starts his practical work, the practitioner of Structural Integration evaluates the factors contributing to the structural deviation of the TMJ. We have designated these factors as cranial, cervical, and mandibular traumata, as impact of repetitive psycho-emotional stress, as «general» structural deviation which indirectly governs the TMJ structure.

It is the fate of many manipulative disciplines that they can correct deviations based on mechanical trauma much easier than those which are permanently enforced by psycho-emotional stress.

The technique of the work observes principles which apply to both situations:

- A symptomatic area is to be influenced by connective tissue components which are as far away from the critical area as possible before the critical area is touched.
- Deep components, i.e. layers forming the intrinsic organization of the body, are to be prepared by manipulation of the enwrapping sheets.
- Any correction is seen in the context of creating a new pattern of INTERsegmental order and INTRAsegmental shape.

The practice of Structural Integration has developed mainly towards the direction of intersegmental order in doing manipulation based on analysis of blocks and cylinders. The application of the simple block-model is highly efficient because the connective tissue rules the connection of physical units, just as the bricks of a wall are kept together by mortar. But stability of intersegmental improvement does not only depend on the way in which the elements of the structural puzzle are connected with each other, it also depends on the intrasegmental shape of the elements.

With this in mind, the stability of a structural correction depends on the relationship of intersegmental order and intrasegmental shape. We expect those intersegmental alignments to be stable which go only as far ahead of the chronic pattern as structural coincidence with intrasegmental shape allows for, or, to put it in more speculative words, the quick course of intersegmental development meets with the slow course of change of intrasegmental shape.

From this perspective we see why mechanical trauma can be resolved easily as soon as manipulative intervention follows soon after the traumatic event: in such a case mechanical forces have disturbed intersegmental structure. Unless bones have been altered in their shape or ligaments have been torn, our manipulative approach has just to re-establish an appropriate connection between elements which should be respected in their integrity. If the trauma occurred long before manipulative intervention, the long-term intersegmental disturbance may have altered a few elements in their intrasegmental shape. The situation is similar to that of repetitive or permanent psycho-emotional stress: it is not only strain patterns around a junction which are causing trouble, it is the deterioration of constitutive elements of that junction, their altered shape embedded in intersegmental disorder, which perpetuates a vicious circle of strain.

Seen from a technical theory perspective, the teeth, possessing an occlusive quality, are a main intrasegmental element. Their combinatory quality can largely be shaped by standard intervention by a dentist. There are other intrasegmental elements like the bony shape of the mandibula which can be changed slowly in their developmental direction by manipulative intervention around tensional forces coming from the tongue and connective fibers of the masticatory muscles. And there are constitutive elements inside the TMJ, inside the joint, and around the joint capsule, which are available for subtle indirect manipulative approaches. The connection of the lateral pterygoid muscles with the discus articularis is seen as a keystone in this context.

We arrive at the conclusion that we can avoid some of the «trickiness» of the TMJ by combining a dentist's intervention with the integrative work done in connective tissue manipulation. The result is a combined improvement in the structure of intersegmental order and the function of adequate intrasegmental shape.

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Hans Flury

On some Aspects of Folding

Folding is representative for movements where the existing balance is kept unchanged as opposed to locomotive movement. This means that the Line, which passes vertically through the gravity center of the body, remains in its place in space. Therefore the «line», the long axis of the body, must bend to make it possible for the foot-to-head distance to decrease.

Keeping the Line where it is demands that the weight of the body be distributed equally in front and in back of it. For anatomical reasons the knees cannot bend back but only forward and so form the anterior fold. The pelvis must compensate by folding back, and the upper body must tilt forward around the hip hinge. The gravity center of the body then descends on the vertical Line.

The body sinks naturally when muscle tone is reduced through the effect of gravity. The functional view then does not concern itself with muscle contraction but only with the question of which muscles must let go to achieve the optimal form of movement. The structural perspective identifies those parts of the fascial net which inhibit optimal Folding to work on them.

The average pattern of Folding keeps back the knees, refrains the pelvis from swinging back out, and also keeps back the upper body, shortening it in front. The aspect is that of someone crouching in the narrow gap between two walls in front and in back, compressing the core. But the theory of Structural Integration demands that the body lengthen in movement. This leads to the recognition that the folds must swing out far and easy, and in fact the correct movement in the structural sense not only keeps the «line» long but actually opens the core. This happens successfully when the concave side of the folds does not shorten, which depends on the convex sides lengthening. Then the center line will also be longer.

The shopping bag model provides a vivid metaphor as the body stocking restricts the folds in going out when it is tight. For the knees there is a well-known image which favors relaxation of the convex side. The client is asked to imagine the bones which compose the knee to slide forward through the flesh.

In the physiological reality letting the body sink down in Folding is initiated by tonus reduction. But soon this must become selective, and some muscles are even tensed more. They control Folding and prevent the body from collapsing instantly. For the knees, it is exclusively the vasti which should monitor the movement. The rectus femoris should not be involved as it refrains the pelvis from sliding back once the thighs are in an oblique position. It is not infrequent that Tai Chi practitioners complain about pain in their quadriceps – and are astounded about its sudden disappearance once their pelvis is permitted to settle into an anterior tilt and the upper body is brought forward over the feet.

Another false pattern at the knee is given by active tension

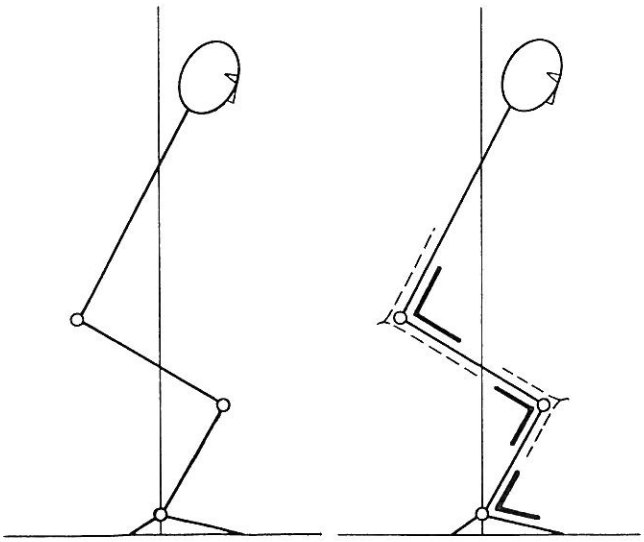
in the hamstrings and the gastrocnemii which hold back the proximal ends of tibia and fibula and the distal femur respectively. They should also be relaxed completely, especially as they obstruct the pelvis and the heels going back by their opposite attachments. Bending at the ankle should be monitored solely by the soleus, and the pelvis hardly needs any muscle activity to contain it: it is hampered enough by tension in the fascia.

Apart from the different arrangements of the body parts when experimenting with Folding, balance as the basic principle of movement should always be checked and reestablished intermittently. The folded body is slowly rotated around the ankle hinges from where the weight is clearly felt to be too much forward to where it is sensed too much on the heels. Somewhere in between it is balanced optimally. The subjective criteria for this range are the clear sense of the weight passing through the ankles into the ground and the relaxation of the muscles, especially those of the feet.

The Pelvis

In the standard internal the pelvis is posterior and tilted anteriorly. As Folding is in the sagittal plane, front-to-back balance is the appropriate frame of reference for its description. Other aspects as left-right balance and rotation are less relevant. But as the pelvis is embedded in and dependent on overall structure, these and other factors modify of course the pattern and may even reverse the picture here or there. So although it is the pattern which is under consideration, it is granted that there are exceptions to it. Neglecting them is justified by the realization that their specification rests on the perception of the basic pattern. The dynamics of the structural internal pelvic type must be considered from at least four sides.

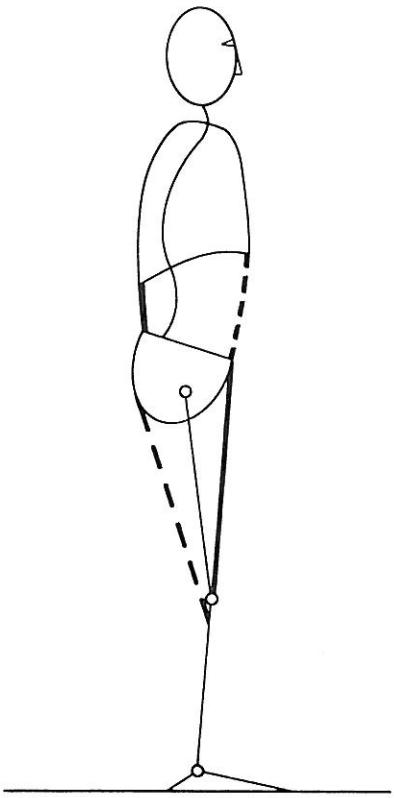
Ill.1 Folding of a model with fixed mechanical hinges (left) and schematic drawing of convex contours (dotted lines) which lengthen and concave contours (lines drawn out) which must stay long (right).



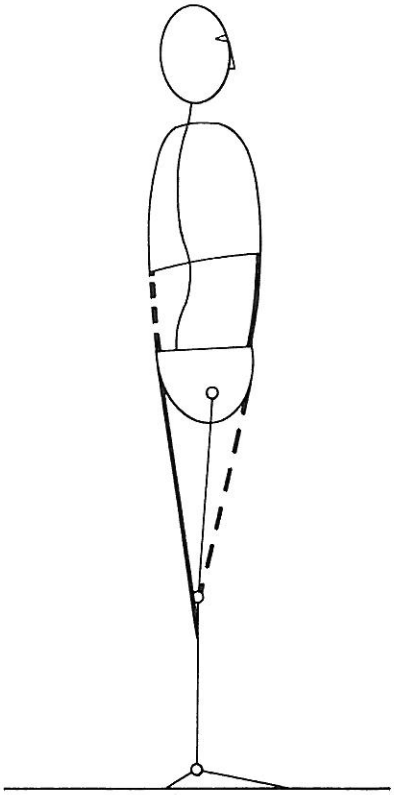
1. The type is maintained by gravity. Once it is established, the vector path of the weight of the upper body passes through the pelvis in front of its center and the hip joints. The weight pushes down the anterior part of the pelvis further, reinforcing the anterior tilt, and regarding the resistance from the block below, the thighs, it tends to shove back the pelvis more.
2. The structures in primary shortness can be identified by studying the geometry of the type. For front-to-back balance, these are primarily the fasciae of the rectus femoris/sartorius/tensor group, the adductors, the iliacus, and the lumbodorsal fascia. The last pulls up and forward – or doesn't let sink down – the back of the pelvis by its attachment to the iliac crests and dorsum sacri. The others pull down the pelvis in front and push it back. The iliacus is especially representative. It is highly effective in tilting as it runs nearly on a semicircle around the anatomical axis through the hip joints. But it also aids in keeping the pelvis back by the force it exerts on the pubic bone which is from front to back.
3. Compensation (secondary shortness) is primarily by the abdominal wall and the hamstrings, whose tissue is chronically overstretched and rigidifies in counteracting the effects of gravity and the structures in primary shortness.
4. The geometry of the fascial web determines the pattern of muscular tone. If it were assumed to be zero – and if the structure held up – the «pure» structural situation would reveal itself. From this point, muscular activity, active tension, modifies the passive tension pattern as given by gravity impacting on the fascial web and therefore changes the geometry of the body in space. This can be in the direction of the actual passive tension preference as when one exaggerates one's structural pattern. The tone of the muscles along the primary short tissues increases then. Usually the structure is modified posturally in the opposite direction automatically as it renders the situation more economical by arranging the blocks more «normally». This is by an increased tone of the muscles along the tissues in secondary shortness. So usually the tonus of the muscles tensing the compensations is higher than that of those along the primary short structures. In other words, the structural preference introduced by gravity is counteracted by muscular tension, which describes the starting point for the observation of the structure going more into its aberration when muscular tone is reduced.

Gravity and primary shortness are closely related in that the second is caused by the first and vice versa reiterates and consolidates the structural preference induced by the first. The tissue is chronically shorter than it would be in a normal structure. As it is also less – and less often – stretched, it adapts to the decreased distance between its attachments to bone and other fascial tissue by regulating its neutral state at the lower level of demand.

Secondary shortness and muscular tone are related similarly but in the opposite direction, in counteracting the other pair. So while on the functional level active muscle tension counteracts gravity, the situation is mirrored on the structural level by secondary shortness, in unison with muscle tone, counteracting primary shortness which acts on gravity's side.



Ill.2 Superficial lines of primary shortness (drawn out) and secondary shortness (dotted) in internal structure.



Ill.3 Same for external structure.

The movement of the internal pelvis in Folding is initiated and actually carried out simply by generally reducing the tone of the muscles acting on it. If they do so in proportion, the difference between the higher tone of those compensating gravity's effect and the lower one of their counterparts will tend to level out. The resulting imbalance will manifest the effect of gravity on the pelvis by moving it back and at the same time tilting it more anterior, which is in this case the desired direction. Formally speaking, gravity is the «prime mover» for the movement.

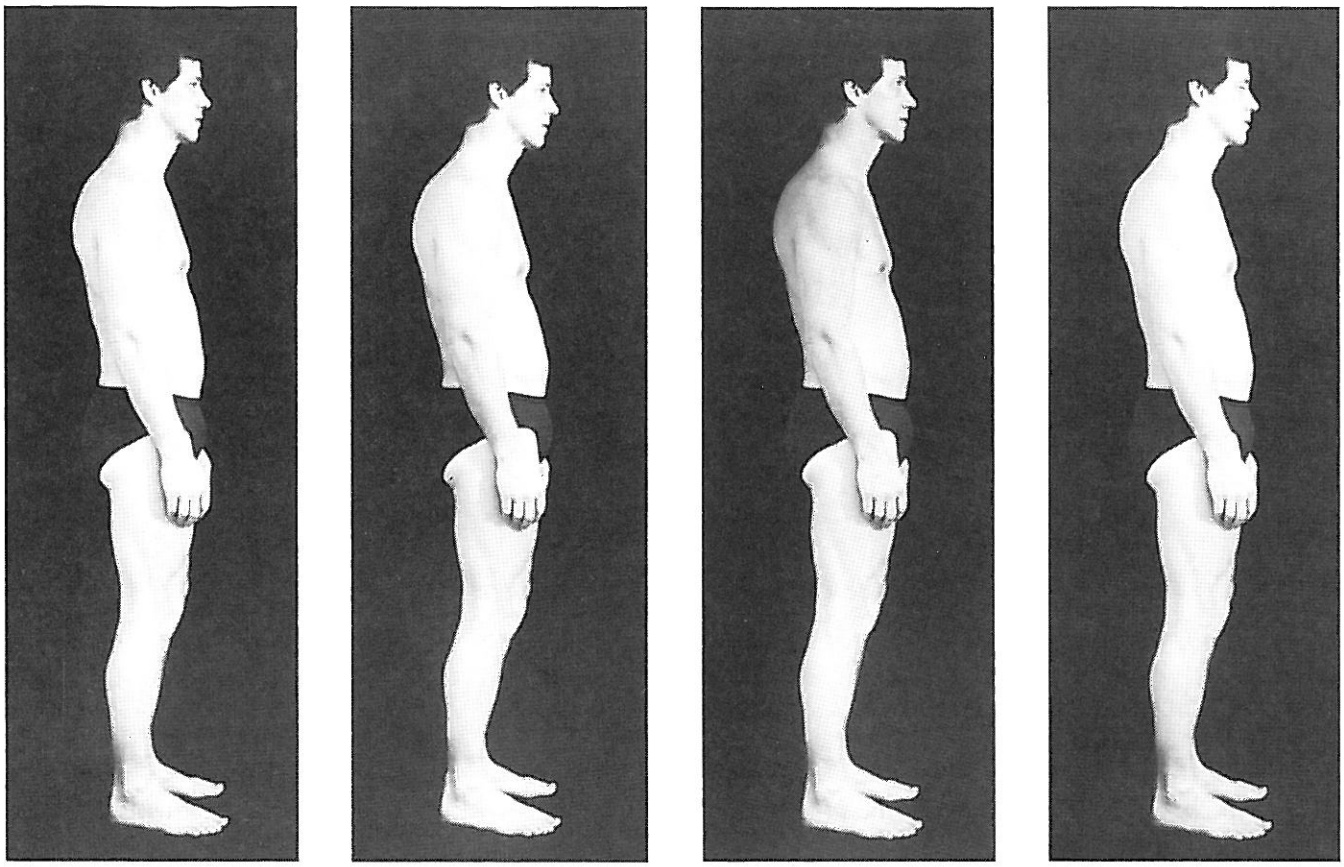
This works well with many people in practice. But not infrequently there arise complications in that they involuntarily change the tonus pattern selectively. This means that they don't reduce – or even increase – active tension in compensating tissues. This shows for the abdominal wall by keeping the contents of the belly in and back, which is a frequent and unconscious habit. Clients must then be encouraged to let the belly come out. The automatic inhibitions can sometimes be bypassed by concentrating on the pubic bone: it should be allowed to sink and swing back loosely between the legs.

Concerning the hamstrings it must be realized that they act more or less in concert with the glutei, the rotators, and the pelvic floor. Release of the whole group is often easiest when the clients are encouraged to relax the pelvic floor, letting it drop down and swing to face *back*. Usually the space in the back is the least known and «owned» in consciousness of all the six directions, and there are often strong hesitations to «take that space», expanding backwards. As sexual connotations are always present, they may just as well be addressed openly and used to experiment playfully. This usually helps to override deeper fears which are associated with this movement and which to treat verbally seems neither productive nor appropriate.

The state of affairs is decidedly different with the external pelvis which is anterior and tilted posteriorly. Here it is not a question of simply letting the pelvis go into its structural aberration by unspecific muscular relaxation. The tilt and the position of the center of the pelvis with regard to the Line must first be reversed in their direction. Energetically the movement is uphill first, then over and down the other side.

The structures in primary and secondary shortness are roughly opposed to those in an internal pelvis. Muscle tone must be reduced selectively only in the tissue in primary shortness, the abdominal wall and the hamstring/glutei/rotators complex. This minimizes the posterior tilt and the anterior displacement of the pelvis. In general the external configuration seems to be less strongly fixed tensionally and determined more by gravity, with collapse more apparent than the dynamics of conflicting active and passive tension. It is sometimes possible to just reverse the trend by maximal relaxation of the rectus abdominis and the pelvic floor, especially when the upper body which is posterior is brought in front of the Line, in this way supporting the intended direction with its weight. Otherwise, active tension must intervene. The choice candidate for the task is the iliacus as the most intrinsic muscle available.

This highly differentiated movement is not easy to evoke. Fortunately, it can be sensed and controlled easily in the pelvis rock when sitting on the bench, which is usually done



1 2 3 4

Ill.4 Initiation of Folding in external with pelvis anterior and tilted posteriorly; -1 erect stance; -2 unspecific general relaxation increasing anteriority and posterior tilt of the pelvis; -3 specific relaxation of abdominal wall and hamstrings brings pelvis closer to «normal»; -4 additional increase of tone of the iliaci brings pelvis in back of the Line and tilts it anteriorly, readying it for Folding by gravity.

early on in the series. There, the pelvis is turned around from rolling back down, propelled by gravity, to going forward over the sitting bones to in front of them exclusively by the action of the iliaci.

But as the main intention is to have the client experience the direction of tilt and sagittal shift, one should not hesitate to involve the extrinsics at the cost of compressing the core. So to get a very clear sense of the situation the erectors/quadratus and the rectus femoris/adductors can be used to produce the experience of «the tail of the diving duck». The client can then be asked to release the lower back and the knees slightly, decompressing the core, while maintaining the direction of the pelvic tilt and position. If all fails, the proved method of going in both directions alternatingly to their maximal range will usually bring about a sense of what it is all about. But by then it should have become evident that what is needed most is structural change facilitating the movement.

The Upper Body

The considerations for the pelvis postulate that the abdominal wall be relaxed. This runs cross to an «instinct» most Rolfers share, if not in theory at least in practice. For, it lets the pelvis sink down in front into an anterior tilt. But it is also in conflict with values shared by large segments of modern society which call for the belly to be flat and hard. It is however in tune with ancient aesthetic preferences which are still esteemed in wide parts of the world. And it suits the author, for whom one of the greater pleasures lies in resting his head on the soft belly of a friend. A sounder argument is the fact that horizontalizing the pelvis is in Rolfing meant in a structural context and does not extend to postural correction, which moreover leads to pulling the chest down.

Experimenting with letting the pelvis tilt posterior in Folding shows that the front of the body shortens invariably. It is only with strenuous contraction of the muscles of the back that the chest can be held up. The abdominal wall is the

main structure which must be relaxed if the concave contour of the pelvic fold should remain long. The «line» in front of the spine lengthens and the lordosis of the lumbar spine diminishes in Folding when the front is let go maximally and the back doesn't shorten. The deep muscles of the back must keep some tone to prevent the spine from bending forward above the LDH.

Encouraging clients to let the belly go soft results often in the undesirable effect of the chest sinking down but the pubes still being held forward and up. It must then specifically be asked for the lower abdomen to relax. Still, the chest very often collapses, which is partly due to a resistance against bringing the whole of the trunk forward over the feet. In many cases a three-step procedure helps to at least give an idea of what is meant:

1. The client is encouraged to pull back his shoulders forcefully to push his chest up high and far forward. The trunk so comes over the feet. The chest is held in a hero's pose by the muscles of the shoulder-girdle from pectorals to serrati anteriores. The client is then asked to keep the posture but relax the pelvis and the knees which have tended to go into hyperextension. This brings the pelvis back under the upper body and into the anterior tilt.
2. The shoulders are let go slowly to come down and around forward for the arms to hang loosely along the sides without changing the pose of the thorax. Holding is now transferred to the muscles of the back, and it is usually necessary to release the pelvis again. This goes with some lightening of the load for the erectors and activation of the deeper muscles of the back. The chest is still held high, up, and forward.
3. I then touch the client on the sides, going up the thorax and the neck to in front of the mastoid processes, asking him to imagine feeling a mast there. When the picture is firmly in his mind, he should let his sternum and the ribs hang down from the mast without bending it. I use the image of a flag hanging from a strong flag-pole.

The Feet

The special status of the feet in Folding derives from their being fixed to the ground. They cannot tilt or slide forth or back. By definition the support point of the body is always on the vertical through its gravity center, the Line. If the gravity center shifts, the support point by necessity shifts exactly along with it. Mechanics limits clearly the range of where the support point – and with it the gravity center – can be geometrically. For standing on one foot, it has to be in the area covered by the foot. Otherwise one falls irretrievably notwithstanding any muscular efforts or equilibrist abilities. When standing on two feet, the range is given by the area covered by the two feet and the one in between bound by two tangents. The fact is illustrated by the popular children's trick of asking a portentous adult to stand straight with feet closed and sideways to a wall. It is impossible.

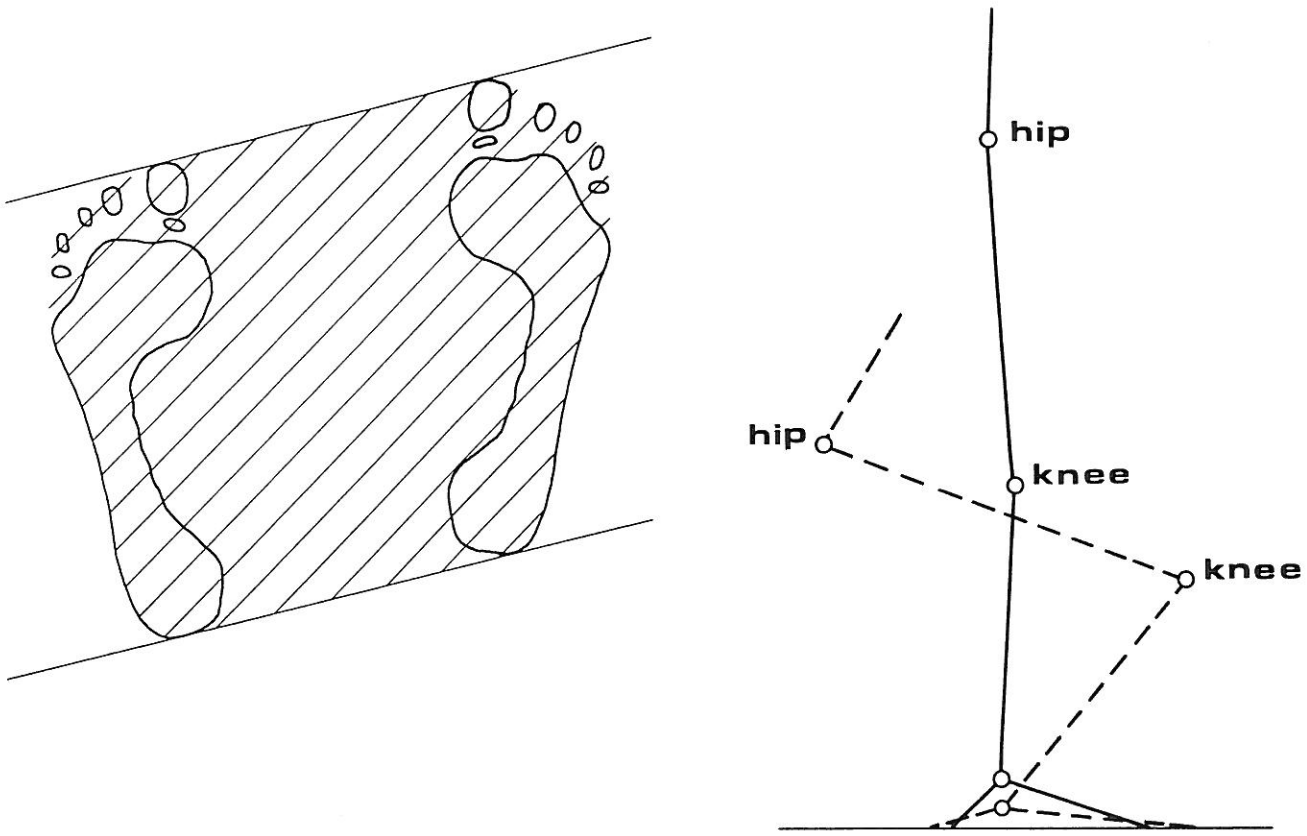
For standing on both feet, the support point is usually virtual, between the two feet, and it is replaced for physical considerations by the support point of each of the two feet. By the ingenious design of human structure, the two are also virtual: in a place where the feet do not contact the ground. Their lateral projection is on the same vertical which passes through the gravity center, on the Line. Furthermore, according to the theory of normal structure, the point which is the lateral projection of the ankle hinges is also on the Line. As the segment of the foot is immobile with respect to the ground, its gravity center is also on the Line. With the exception of the gravity center of the body, the respective projections on the frontal plane are also on two vertical lines through both legs. But these cardinal points may move on the vertical, seen from the side, without impairing balance, and indeed they have to if the criteria of balance are to be met. This means that the feet have to adjust their shape in order for the critical points to stay in line and for balance to be kept.

The physical considerations are simple. Initially in Folding the body accelerates negatively, it falls, lessening the pressure of the weight on the feet. In going up the pressure increases in the beginning. When the movement becomes linear the pressure is constant. These changes are small but essential to be felt clearly, as learning is almost entirely by kinesthetic cognition and images, not by explanation of reductionist theory. Learning means for Folding concretely that the «random» mechanism of contracting the feet – to safeguard against shifts of the gravity point of the body – while letting down the «rest of the body» is suppressed in favor of pure relaxation. It is easy to experience this physical side in an elevator. When starting down, pressure on the feet becomes less – one is lighter – and vice versa with going up.

The dialectics of balance demands that the weight of the body be let down to the ground completely for the arrangement of the blocks to be able to induce lift. But in going down the weight on the medial arch which keeps it spread in the sagittal dimension is reduced and the arch tends to contract. As not losing contact with the floor – or keeping the sense of physical grounding – is essential for balance, the physical tendency must be minimized and counteracted. The first is helped by folding in extreme slow-motion, in this way reducing the loss of grounding. Experimenting with the opposite sharpens the sense of it, too. So it can be tried to let the gravity center of the body do a free fall for 5 to 10 centimeters with the legs going completely slack. This is more difficult than it seems because of motoric patterns which want to jump up first or pull up the legs actively. Extending the body maximally, whereafter only letting go is possible, provides a semblence of the sensation – and develops discrimination for feeling grounded.

Physiologically, the physical tendency is counteracted by letting the feet go as soft as they can. The client imagines the feet spreading in front and the heels sliding back as his weight brings down the arch. The foot spreads like a sucking cap which is pressed to the floor. The practitioner's fingers under the arches which the clients tries to squash with letting the weight bear down on them facilitates the movement greatly.

The tendency for contraction is furthermore counteracted by the relaxation of the anterior compartment of the leg in flexing at the ankle. At least the tibialis anterior gives up its important contribution to holding the arch up. And this is not matched by a comparable increase in the stretch on the tibialis posterior and the peroneals as they don't take the long course around the convex contour, the back of the calcaneus, but run down much more anteriorly behind the



Ill.5 Area where the gravity point of the body can be (left) and behaviour of the foot and leg in Folding (right).

malleoli. The minimal passive tension imposed on the flexors makes it possible that the calcaneus can slide back between them – if the short Achilles tendon does not prevent it.

So the result for Folding – if it is in the extension mode – is for the feet that the physiological and structural effects reverse the tendency introduced by the physical one. The foot lengthens in coming down forward as well as back. It is generally more difficult for the heel to slide back – which roots the obsession of some Rolfers who insist that the client must «have heels» in a severe and real problem. Help comes sometimes from explaining that if the leg rotates forward around the ankle hinge, then what's below must rotate back.

And of course in going up the client's attention should be focused entirely on extending against the ground, spreading the «sucking caps» even further.

Sitting down/ Standing up

The problem becomes most evident when someone is asked to stand up from the sitting position without using his arms. Especially with deep, soft armchairs the task can almost be used for a party game. If the easiest way is sought instead of contortions and energetic jerking up, Folding may be tried.

Sitting down is made easier by putting one foot in front of the other with the hind leg touching the chair. Then, a slight shifting of the weight in the sagittal dimension can easily be compensated by redistributing it on the feet. The procedure is less hampered by contractions with which the less expert tend to counteract imminent imbalance. It also seduces them to shift the weight back! So once the movement is established, it should be tried with the feet parallel beside each other.

The movement is in two phases. In the first, the gravity center of the body is lowered strictly on the Line until the sitting bones touch the surface of the chair. It can be experimented with continuing Folding until most of the weight is on the chair. This then starts to act as a lever point and bends the upper body forward down more when the movement is led farther.

It is easy to experience that in Folding the tuberosities have to swing back out, the pelvis going back and tilting forward at the same time, for the buttocks to land in front of the tuberosities. For the second phase it is important that the pelvis stay in front of them. It is often necessary to instruct that the upper body rotate back around a transverse axis somewhere through the lower lumbars, with the pelvis being drawn along only reluctantly. Due to the omnipresent shortness of the hamstrings, the lower lumbars must be as anterior as possible for the pelvis to be able to rest in front of the tuberosities in sitting anyway. But it must be seen to it that it is exclusively the iliacus which holds the iliac crest forward actively and with it the lower lumbars passively, and never the psoas which would pull the upper lumbars forward

and down. The tilting back of the upper body is partly by the elastic energy stored during the lengthening in Folding, the rest should come from exerting pressure against the floor through the soles of the feet. Later, when the tissue has become more resilient and the body stays securely in front of the sitting bones, the trunk may of course simply rotate back around the hip hinge. Attention should then be focused entirely on the sitting bones sliding back at the same time. This, the going back of the tuberosities through slight pressure through the feet against the floor while the trunk bends forward and lengthens, is also the initial focus for standing up.

The principle of lengthening in movement is very evident and conscious with sitting down, as everbody strains to reach far back with the pelvis to land securely on the chair. It can be accentuated when Folding is initiated by Bending. When the trunk with the pelvis is near to horizontal, movement is stopped. Alternating with focusing on balance, the pelvis is let out more in back and the head with the parietal area leading reaches forward. The chest may be held up and out a little to achieve maximal length in front, from the pubes to the parietals. The back, from coccyx to the top of the head, is then released to become longer, and the center line in front of the spine is as long as it can possibly be. The reduction of axial pressure in Bending permits this maximal lengthening of both front and back. Only then the knees are allowed to go forward, and the whole of the trunk is lowered slowly without shortening until the tuberosities touch the surface of the chair.

Hans Flury

Structural Levels at the Pelvis

The hierarchy of structural levels proposed elsewhere[1] consists of – from top to bottom –: intersegmental configuration, intrasegmental configuration, and shape of bones. «Top» means high complexity, «bottom» low complexity. It is justified to distinguish levels because the progression from considering single bones to the arrangement of all the segments of the body is discontinuous. The description of various bones may be simpler or more complex, but it is always the same set of parameters which is used. These are geometric figures and the properties of bone tissue, which can be subdivided into a few types. When looking at a single body segment, entirely new categories come into play. New tissues with different properties appear. They cannot simply be added to the already existing descriptions of the bones as they interact with them generating more something like a product instead of the sum of these various properties. In that a new kind of morphology and mechanics emerges, which is not contained in the parts, the language which describes this new whole must be qualitatively different. Another qualitative jump happens when the arrangement of all the segments becomes the object of examination. The most important new factor entering the picture and changing the language of description radically is gravity.

This is not the place to decide the unresolved question whether reality is discontinuous and in layers or not. Certainly our perception is, our mind works with levels, and thence our concepts and therefore our intentions are on different levels. Not only are our descriptive terms, the «words», different on the different levels, but also the way in which we relate them meaningfully, the «syntax», is different. So we use e.g. the term «horizontal» for the knee «hinge», both terms belonging to the intersegmental level, which for the knee «joint» and especially for the bones involved have little or no meaning. On the intersegmental level we refer to the segments as highly abstract rectangular blocks, the internal differentiation of which does not matter. They meet in horizontal planes which are nowhere to be found in the anatomical substrate and are organized around the line of gravity, which is a property of the environment, not of the body. So the term «pelvis» signifies an abstraction on this levels which resembles a brick, possesses three main coordinates and two important horizontal planes where it connects to the segments above and below, which can be conceived as consisting of a homogenous mass, and which means something only inasmuch as it is related to the whole and to the gravity field. On the intrasegmental level, the other segments and gravity disappear from view, but instead we look at a configuration of bones, fascia, and muscle mass, interacting with each other. Here the term «pelvis» acquires more concrete meaning but is again something quite different in morphology and dynamics from the bony «pelvis». So the term «pelvis» has three completely different meanings ac-

[1] Notes on S.I. 86/1, p. 23.

cording to the level under consideration, not to speak of the «pelvis» of the gynecologist, or the chakra healer, or ...

This rather detached view omits the practically so important question on which level it is that one enters the object in question. For it determines largely the result, what one finds, or if one gets «to Pittsburgh»[2]. Almost every atlas starts with the description of individual bones, then proceeds to add ligaments and joint capsules, then muscles, and so forth. It is most accurate and enlightening on the initial level, but when rising to higher and higher levels of complexity, essential factors appearing only on these higher levels are likely to be missed. Ida Rolf's revolutionary approach to the physical body can be interpreted as reversing that order by starting at the highest level, the physical reality of the whole, which led almost logically to the discovery of gravity as the all-important factor organizing structure. And indeed the theory and practice of Structural Integration is fairly sophisticated on the intersegmental level, but the understanding of individual segments is considerably less developed. And the exact shape of bones in an actual structure is hardly a topic at all although it constitutes a clear limiting factor for integration and although it is subject to long-term change through changes of the overall structure. Usually a defensive attitude sets in which prefers to stay where one is at home. So the reductionists tend to go more and more into detail, and the «holists» expand into more and more diffuse generalities. This paper intends to elucidate a little more the block model, but it would be welcomed if it contributed also to an ability of running more freely up and down the ladder, the steps of which are the structural levels.

The relationship between the inter- and intrasegmental levels can be illustrated by a mason building a wall with bricks. His main concern is with piling the bricks exactly on top of each other, in the place where the wall is to stand, using the plummet as his guideline. This works fine as long as the bricks are of good quality. If they are not, if the planes are not parallel and at right angles, or if they are bent, he will have to accommodate for the irregularities by adjusting with the mortar. He may even be forced to cut slices away or fill in parts cut from other bricks. The difference in levels shows when he walks away and may hold the brick in any way to shape it correctly. Neither its location nor its orientation in space matter, which they certainly do for building the wall. In the structure of human bodies the relationship is much more intimate and complex, of course. Not only does the shape of the segments affect the structure of the whole and limit its integration, but the overall structure also modifies the shape of the single segments.

Finally, it should be noted that the concept of levels has practical consequences. For, the integration of structure depends on its analysis. And when one experiments with focusing on the different levels alternatingly, it soon becomes apparent that it is virtually impossible to get a clear picture of all of them at the same time. This may simply be a reflection of the fact that in visual perception, on which structural analysis relies primarily, figure and ground cannot be seen clearly at the same time.

[2] Feitis, Rosemary: «Ida Rolf Talks», Rolf Institute, Boulder.

Intersegmental Level

Defining the position of a solid body in space takes six coordinates. Three of them are for the location of the mass center (translatory component), the other three define the orientation in space (rotational component). The long axis of the body shall be the vertical or x-axis, the planes perpendicular to it the horizontal (or transverse) planes. The left-to-right dimension shall be the transverse (or horizontal) or y-axis, the planes perpendicular to it the sagittal planes. The front-to-back dimension shall be the sagittal or z-axis, the planes perpendicular to it the frontal (or coronal) planes.

This system of coordinates is for the whole body, but it must be pointed out that the vertical axis and therefore the horizontal planes have a special legitimation not shared by the others. It derives from its coinciding with the vertical of the gravity field through the mass center of the body in normal structure and standing. In theory, a difference must be made between the Line, which is a property of the gravity field, is always vertical, and goes always through the mass center of the body, and the «line» which denotes the long axis of the physical body. The first is meant in the statement that «man is something built around a Line». The «line» of course turns and bends, and it is the «line» which lengthens in movement, not the Line, because the body lengthens and not the gravity field. In practice they are sometimes equated as when we say «he has found his line». This sentence can then be interpreted to mean structurally that somebody can bring the «line» sufficiently close to the Line in standing and functionally that he can lengthen in movement. The eminent practical use lies in the fact that there is a reference line from an entity outside the body, the gravity field, to which we can adapt the structure in the vertical dimension.

This is not so with the y- and z-axes. They have to be deduced from inside the body and have therefore no absolute reference. While the direction of the Line is there whether a person is actually present or not, we need that person concretely to determine the y- and z-axis. Even then, no absolute transverse or sagittal axis can be determined. We can take the line in front of the big toes, or that between the anterior superior iliac spines, or between the ears, but anyone we choose is arbitrary to some degree. The problem is usually solved simply and sufficiently by asking the client to stand facing us, with the line between us defining the z-axis. The y-axis is then also defined as the line perpendicular to both y- and z-axes.

For the rotational component, the axes are a property of the segment in question and determined sensibly in such a way that they coincide with the axes of the body in the normal structure and position. They shall be the x'-, y'-, and z'-axes. The difference is illustrated at the pelvis when we rotate it around the y'-axis, tilting it, which rotates the x'- and z'-axes along with it but scarcely affects the xyz-system of the body as a whole.

A shift along the x-axis would mean that the pelvis is «high» or «low» and would correspond to the impression that the pelvis is jammed down on the legs or floating above them. As this cannot be determined easily, and as it rather strains the imagination when thinking of the skeletal implications, the shift along the x-axis is disregarded. It can be replaced reasonably by the notion that it appears dependent

on the other variables. So it is assumed that the pelvis is at its «highest» possible place when no displacement along the y- and z-axes and no rotation is present.

Along the z-axis, the pelvis can be anterior or posterior, along the y-axis towards the left or right. The y'-axis allows to define an anterior or posterior tilt, the z'-axis a right or left (down) side-tilt. The x'-axis defines a right anterior or left anterior rotation[3]. This definition of terms should avoid confusion between a posterior and a posteriorly tilted pelvis e.g., the second being usually anterior. The translatory components define the position of the mass center of the pelvis in space, the rotational components give the orientation of the pelvis in space.

In a real stack of blocks, each one of them has three degrees of freedom: it can be forward or back, left or right, or it can be rotated around the vertical axis through its center. It poses no problem in principle to expand the sytem to the five or six degrees of freedom postulated for the pelvic segment of the body. The question of what this means concretely in the living reality is much more intricate. It is immediately evident that the freedom of the body segments is restricted – by anatomy – much more than that of the blocks in a stack. Three kinds of limitations can be discerned, ordered according to increasing range of effect:

1. The congruency of the bone surfaces meeting in the joints must be respected. The placement of a segment can only be along the physiological range of movement possible in a joint, if the adjoining segment is to remain in place. As the hip joint has only three degrees of freedom, and the two on both sides together even have only one, the six dimensions of the block model cannot even nearly be accommodated. This reminds one again that the abstraction of blocks is on a different level from that containing anatomy and physiology. While it is obvious that something like a dislocation of the pelvis to one side with the legs remaining in place is simply crazy from the anatomical point of view, it must also be remembered that the more realistic tilt of the block of the pelvis is, at least in theory, not exactly the same as the tilt of the pelvis in the flesh. The first is around the y'-axis through the mass center of the pelvis, the second around the line through the rotational centers of the two hip joints. So the placement of the pelvic segment will always entail adaptations in the other segments, even when the tilt is examined, by virtue of the limiting factor of the congruency of joint surfaces.
2. The more linear connections between segments, mostly the fascia and tendons of muscles criss-crossing the space of the body, will also force the other segments to adapt.
3. The body fascia and its subdivisions of flat muscles encased in it which forms a system of closed planes, the body stocking, will by transmitting tension along the whole surface of the body induce reactive changes in the other segments.

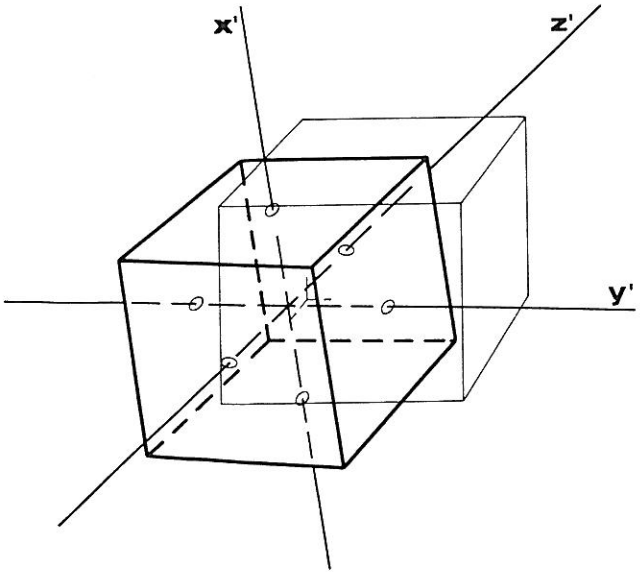
Of course, the concrete kind of location and orientation in space of all the other segments will be dictated by gravity, within the framework of the possibilities of the fascial web and shape of bones, and modulated by the intentions and habits of a person. The immense range of factors involved renders the situation unpredictable with structural changes, which is of course the reason why Rolfing is an open-ended and fascinating undertaking instead of a dull application of automatic «grips».

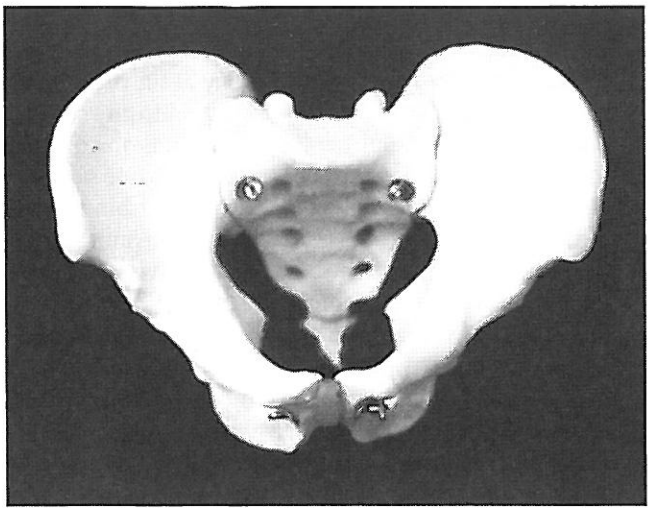
In theory, the translatory components would be determined by defining exactly the location of the mass center of the pelvic segment with respect to that of the other segments and the Line. In practice this is not possible, and even if we had a sophisticated computer program the situation would not change because we could never give it the data it needs. In clearly aberrated cases, however, the direction of shift can be seen and even approximated quantitatively, and a better and more concise understanding of the block model could probably help develop intuition by visual perception. The above formulation indicates another incertitude in that it leaves it open whether we determine the shifts of the pelvis with respect to the neighbouring segments or the Line. They are possibly not identical. The functional tests described later relate the position probably more to the Line, while visual perception could tend more to the local aspect.

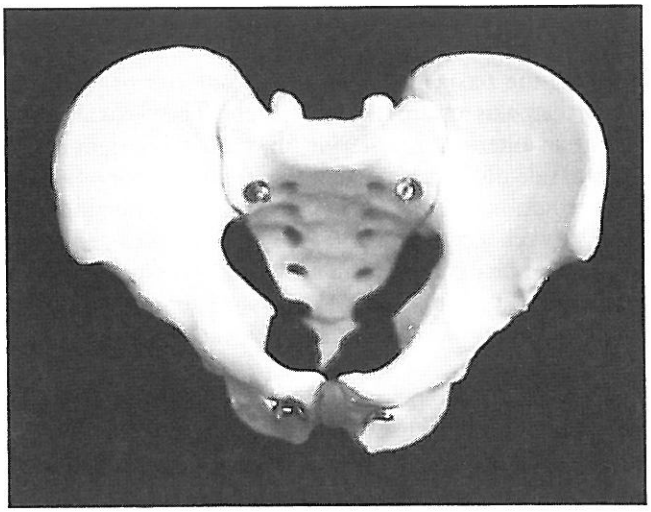
The second, «intersegmental» aspect in the narrow sense, is of course the bread and butter of a Rolfer's everyday life. The three limiting factors permit to structure the local analysis somewhat. The skeletal factor enters when comparing the segment of the pelvis with that of the thighs. An anterior shift of the pelvis will e.g. take the femoral heads along forward and «tilt» the thigh segment anteriorly. Or a difference in the height of the femora or a rotation of the legs around the x-axis will be related closely to the position of the pelvis. An anterior pelvic tilt could be on top of an anterior «tilt» of

[3] «Rotation» is reserved for the rotation around the x'-axis. «Tilt» and «side-tilt» are also rotations, but around the y'- and z'-axes. Note that these terms and «shift» do not actually denote a movement but the coordinates of the «structural point», the place of least energy, where the pelvis would have «shifted» and «rotated» to if it had been in the normal position first.

Ill.1 The Block is, as expressed by the position of its center, shifted down, anterior, and to the right. Its orientation is: tilted anterior around y', tilted right side down around z', and rotated left anterior around x'.







the thighs or, by pushing back the femoral heads, «tilt» the thighs back. The discontinuous or linear aspect of the connective tissue system may lead e.g. to deliberating whether a right anterior torsion of the pelvis with the consequential reduction of tension in the rectus femoris goes together with more flexion in the knee or its opposite by adaptive shortening. And the aspect of the «body stocking» may make one look with an anterior pelvis for whether the tension in front is compensated by shortening of the front of the thorax, with thoracic kyphosis resulting, or if it continues into the chest, the thorax tilting back, and adaptive shortening occurring in the whole of the back.

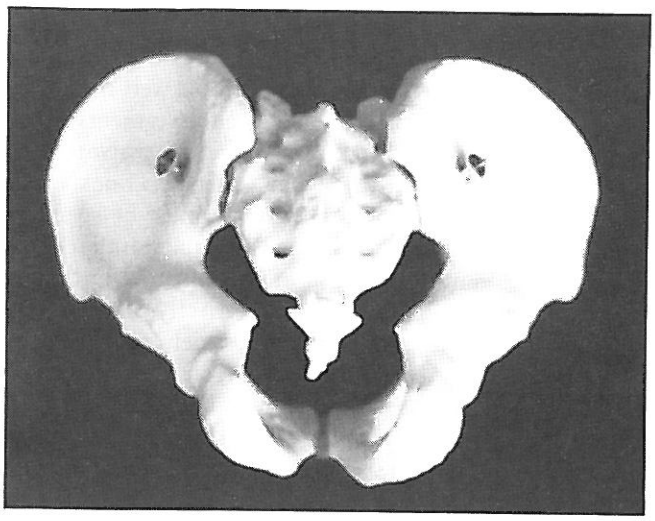
Intrasegmental Level

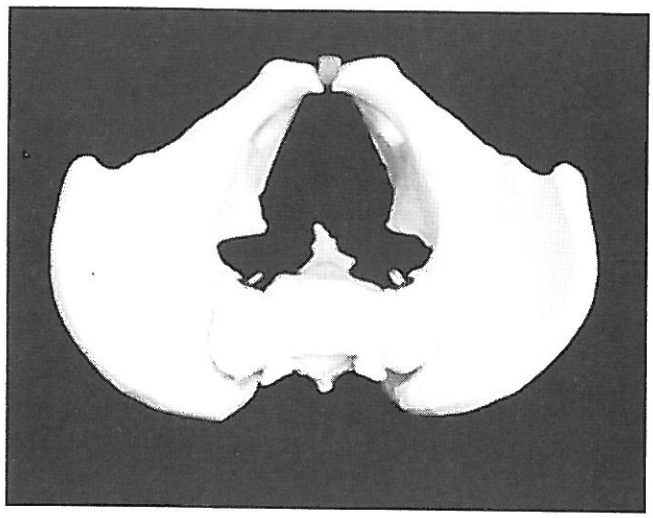
The shape of bricks can easily be evaluated by looking at planes, edges, and angles. Unfortunately, body segments don't resemble bricks at all, especially because their content is anything but homogenous. Their shape can sensibly be appraised by determining the relationship of their constituent bones. This does not imply at all that the bones are a causal factor, and experience confirms the theoretical conclusion that bone juggling is often beneficial for pathology but does little for normal geometry of the fascial web. The exception is of course the skull, where bones make up the most part of the structural network and the internal connective tissue can only be influenced via the bones. The skeletal arrangement serves rather as an indicator of the situation in the fascial web, and normalizing this will result in normal spatial relationships of the bones. So they function as the starting point for structural analysis of the isolated segment and as its end point, allowing to evaluate the structural improvement achieved.

Two polarities determine the shape of the bony pelvis. Torsion is the first to be discussed. The term describes a three-part system where two parts rotate around each other in different directions or in the same one to different degrees. The third component is a mechanical connection between them which is torqued. The concept is illustrated by wringing out a wet towel. The hands and the ends of the towel they grip rotate in opposite directions around a common axis, and the rest of the towel is torqued, wrung out. In contrast to this, rotation denotes a one-part system: a body which turns around an immaterial axis. This terminology means for the pelvis that the ilia can rotate – not around the sacrum, strictly speaking – but around an axis near to a line perpendicular to the surface of the sacroiliac joints.

For torsion, the sacrum and the sacroiliac joints are ignored in a first step. The rotation of the two ilia is then around a horizontal axis in opposite directions. The ligamentous connection between them is torqued, and the sacrum is considered as something like a sesame bone embedded in the ligaments.

Of course, in the second step this model is contingent on the necessity of congruent joint surfaces, which modifies and complicates the situation greatly. The sacroiliac joint does not seem well defined as to the axes of movement. There seems to be to some degree a capability for sliding, for opening and closing in back and front and top and bottom. So when only rotation around an axis perpendicular to the joint surfaces is regarded here, it must be taken into account that this is always modulated by other movements. In another reductionist step, the joint is viewed as a flat plane. Then the orientation of the planes of the left and right sacroiliac joint in space is such that they converge somewhere below the pelvis and in back of it. The line perpendicular to the planes then goes from lateral, caudal, and posterior to medial, cranial, and anterior. This is the case for a relatively vertical sacrum, and the anterior rotation of the ilium is then in such a way that the anterior superior iliac spine goes forward, down, and lateral. The posterior superior iliac spine goes forward, up, and lateral. The ischial tuberosity goes medial, back, and up. The situation changes and some





Ill.2 Model of a male internal bony pelvis with right anterior torsion; -1 front view; -2 same negative as but copied the «wrong» way to show symmetrical left anterior torsion; -3 top view; -4 oblique view from front and top, note twist of sacrum.

parameters can even reverse direction with a more horizontal sacrum, where the joint surfaces also converge in back but more cranial than caudal with respect to the horizontal plane. The anterior rotation of the ilia can acquire more an aspect of widening or external rotation. Anterior and external rotation of the ilium are used as synonyms.

Usually attention focuses more on the movement of the sacrum: nutation («nodding»). It rotates ideally around a horizontal axis which is here assumed to be in front of S2. The position of this axis actually varies widely. The assumption is based on the experience in palpating the craniosacral motion of the sacrum. There, usually a component of rotation around a transverse axis through S2 and one of sliding on the circumference of a circle with its center at the focusing point of the sacral concavity can be found. To examine the movement of the ilia that go together with the nutation of the sacrum, it is easier to reverse the view. So when the ilia rotate anteriorly, the sacrum relative to them rotates back. With the ilia rotating posteriorly the sacrum nutates forward relative to them.

This leads to the second polarity between both ilia being rotated anteriorly or posteriorly. It follows that in an external pelvis the ilia are rotated anteriorly corresponding to the flexion phase of the craniosacral rhythm. The anterior superior iliac spines are then wide apart, the posterior superior iliac spines are also wide, and the tuberosities are close together. The base of the sacrum is close to the anterior margin of the iliac crests, and the coccyx is forward and in. The tuberosities and the coccyx form a small and flat triangle. The pelvis appears to be broad but flat.

In the internal configuration, the ilia are rotated back. The anterior superior iliac spines are close together, the posterior superior iliac spines are also close, and the tuberosities are farther apart. The sacrum is more horizontal in the pelvic ring, with the base deep and in front of the pelvic rim, the coccyx far back out. The tuberosities and the coccyx form a large triangle with its apex, the coccyx, high on its base.

The diagnosis can easily become confused when inter- and intrasegmental levels are not kept clearly apart. For, the pelvis as a whole, i.e. the «block» of the pelvis, usually - but not always - goes with the sacrum and therefore opposite to the direction of the ilia. With an internal pelvis, the sacrum tilts forward and down with its base intrasegmentally, and the block of the the pelvis also tilts anterior intersegmentally. The ilia rotate back, but as the range of the block movement is much greater, the anterior tilt of the pelvis overrides the opposite tendency of the ilia by several degrees. A dynamics can be postulated between inter- and intrasegmental vectors in such a way that the domineering anterior tilt of the pelvis is partly counteracted by the posterior rotation of the ilia. So with an internal pelvis, the sum of the vectors makes the tuberosities - in relation to space and not the block - go wide apart but back and up! With an external pelvis, the sacrum rotates back and the block of the pelvis also tilts back, the ilia counteracting the tendency partly by rotating forward. So the tuberosities are narrow but go down and forward!

The shape and position of the pelvis permit to diagnose, within certain limits, the position of the sacrum in space. Torsion allows to approximate the twist of the sacrum. It consists of a rotation around the long axis of the sacrum and one around an axis perpendicular to the posterior face of S2. The ilium rotating anteriorly takes the lateral angle of the base of the sacrum on its side forward and down, while the ilium rotating posteriorly takes its corresponding angle of the sacrum back out and up. The second component is given by the ilium rotating anteriorly taking the angle of the base of the sacrum lateral, while the angle on the other side is pushed medial. So the base of the sacrum is rotated towards the side of the anterior ilium, and the coccyx rotates away from the midline in the other direction, towards the side of the ilium rotated posteriorly.

Now the aspect of the external/internal configuration of the pelvis is superimposed. With the narrow internal pelvis, the sacrum can be predicted to be tilted more forward towards horizontal, in a broad external pelvis it will be closer to verti-

cal. Then the tilt of the pelvis is checked which when congruent reinforces the rotation of the sacrum found in space. The orientation of the sacrum in space arrived at can be corrected by regarding rotation and side-tilt, and its position by approximating the shift of the pelvis along the y- and z-axes. This procedure should not be understood as a rigid algorithm which produces precise results. It is rather a guideline which may help to «see» the structural situation in the depth of the body a little more clearly.

As the proportions of conflicting tendencies vary widely quantitatively, the reference points on the sacrum and the bony pelvis can behave quite differently. The anterior superior iliac spine of the anterior torsion side e.g. tends to be anterior with respect to its counterpart on the posterior torsion side. But the rotation of the pelvic block may override and reverse this effect. Or it may even be the case that the ilium rotated anteriorly is contained and held in medially by the connective tissue or the femur on its outside so that the posterior superior iliac spine is pushed medial instead of letting to go out lateral. This modifies the position of the sacrum, of course. To further complicate matters, the shape of the bones also changes the picture considerably.

Some Methodological Considerations

The erect and easy stance is the reference line, the standard, which allows to analyze structure to some degree and to evaluate structural changes through manipulative intervention. The two criteria, erect and easy, are rather vague and subject to all kinds of influences, and even together they seem hardly trustworthy of serving as a solid frame of reference. Additional criteria like parallel feet or feet together touching each other introduce strain into the structure, rendering the situation artificial without promising a more accurately defined standard. But in contrast to these principal doubts, the method does seem to furnish some information about the structural state of one and the same person before and after interventions although not all one desires and not in a way tested to be reliable and relevant. The positive experiential fact suggests that the method could be more solid than one would think. And the experience that hardly anything can be said when comparing different persons in their erect and easy stance could lead one to assume that this is not so because of the gross incertitudes inherent in the method but in default of knowledge about structural types and patterns.

«Erect» is in the category of geometry, while «easy» states something about active muscle tension, which is proportional to energy consumption. The combination of the two is in the realm of statics as should be expected. Experientially, the two categories seem to be opposed and so must be related. They are in fact reciprocally proportional, which manifests when the energy necessary for standing is broken down into two components. One component is the energy needed to counteract the gravitational pull on the segments of the body (Eg). In an absolutely normal and therefore hypothetical structure Eg is assumed to be zero. The body would stand without help from the muscles – with no wind blowing. The more markedly the segments are displaced, the more energy is needed by the musculature to uphold the stance. For physical reasons – the law of leverage – the energy needed rises faster than the distance from normal.

In real bodies where there is always more or less of an imbalance expressed by shortness in the fascial web, there is always a choice of posturing. The more the segments are allowed to go where gravity takes them, the less passive tension there is in the connective tissue. The «straighter» one stands – posturally speaking – the more energy must be spent on overcoming fascial shortness (Es). So Es stands for the energy necessary to strain against the short fascia in ordering the segments better. It would be zero in a perfectly normal body standing erect and remain so with the segments coming apart and down – after an initial push. The goal of Rolfing would in this view lie in reducing Es. In random bodies it is at its maximum in «normal» posture. It is in fact so high that it can usually not be overcome by muscle force and the body cannot actually assume «normal» posture.

Fig.1 depicts qualitatively the relationship of Eg and Es to the degree of randomness of posture for a given structure. «Normal» and «random» refer to different postures, not structure, which is constant! Fig.2 shows the sum of Eg + Es, which is equal to the overall active muscle tension, tone. The deepest point of the curve, the «structural point», indicates the easiest stance. The dotted line represents a Rolfed body, where the «structural point» is closer to vertical alignment, «normal», *and* takes less energy to be maintained against the shortness in the fascial network. These circumstances are often taken into account intuitively when evaluating before and after pictures. First the alignment of blocks with respect to the vertical is analyzed, then the result is checked against signs of strain as a rough indicator of muscle tone. If both the alignment is better and the ease is greater in the body, the difference can be ascribed to structural change with certainty.

For the diagnosis of the position and orientation of a segment, the fact is relevant that it will first go in the direction of its aberration when muscular tone decreases. So an anteriorly tilted pelvis will tilt more when muscles relax, or a posterior pelvis will slide back more when the body is allowed to slacken. Or vice versa, when a person is pulling up, standing in more erect posture, the segments will come closer to vertical but not cross over to the other side within reasonable limits. So the difficulty of finding the easiest stance, at the «structural point», is offset by the apparent fact that there exists a fair range around the «structural point» where the direction of deviation from «normal» remains the same although not the degree. An interesting phenomenon manifests with well-ordered bodies. As many of the structural characteristics are on a bipolar range, the arrangement of blocks can be changed over to the opposite direction relatively easily. A well-Rolfed internal e.g. can by slightly pushing forward the pelvis go into an external posture – not structure, of course. But he will feel that this external posture is accompanied by a minimal effort when comparing it with internal posture fitting his structure.

Another problem of the erect but easy stance should be mentionned here. It concerns the locked-knee type and possibly other structural types. There the structure is fixed. For physiological movements – always for Folding and often for Walking – the segmental arrangement has to be reshuffled and partly reversed first. For, hyperextended knees can of course not bend backwards, and so the «posterior tilt» of the

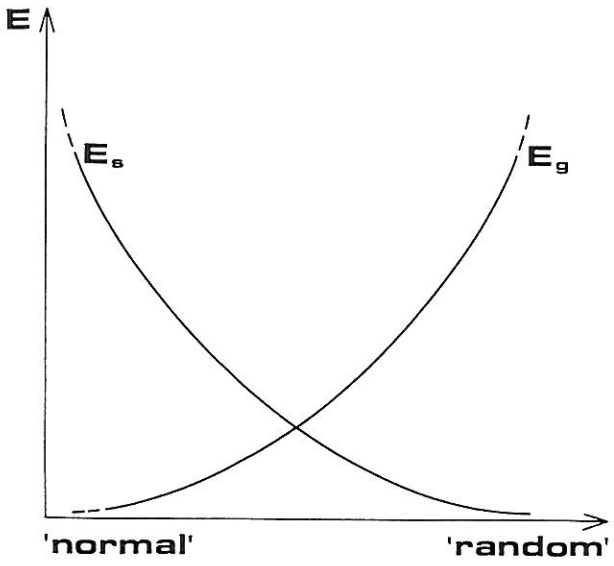


Fig. 1 Eg and Es in different postures of a given «random» structure.

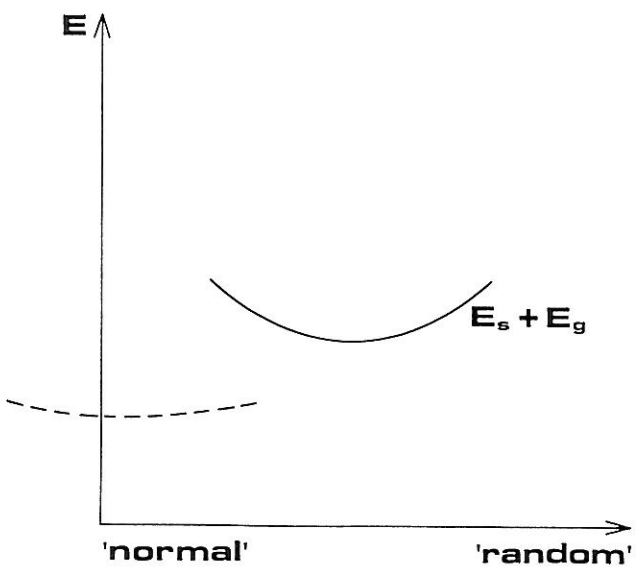


Fig. 2 Summation curve of Graph 1. The dotted line is for a Rolfed body.

lower legs has to be reversed first. While it seems true that the locked-knee stance takes less energy than the normal one, it can be excluded from the discussion. For, in the reality of life hardly anybody stands still for a longer time but moves and shifts around constantly. Then this stance becomes uneconomical because it requires a high activation energy for the body to go into movement every time.

For analyzing the pelvic position and orientation, visual means often don't suffice because the mass center of the pelvis and the edges of the «brick» cannot be determined exactly. The only plain and clear static criterion is for the pelvic tilt. In a normal pelvis, the line between the tip of the coccyx and the tip of the pubic bone is horizontal. So if it is slanted down in front, there is an anterior tilt, and if it lower in back, the tilt is posterior.

The functional tests I use are in two steps. First the two alternatives of the direction one wants to examine are explained to the client. Often it is helpful to indicate the two by soft pressure of the hands. The client may put his hands on the hips with the shoulders and elbows hanging freely. He is then asked to reduce muscular tone and observe internally the direction of the initial movement. I tell clients that just the first millimeter is important. I observe the movement from the outside and sometimes have my hands on to sense it. If the client's observation is the same as mine, the decision can be taken to reflect the real structural preference. I check this observation by asking the client to try to let the pelvis go in the opposite direction, too, and compare which comes easier. This alternating movement can be made gross by an initial push. Then it is observed how fluent the pelvis moves and how far the movement carries. As with the first step, the result can also be assessed from the outside visually, and again client and Rolfer should observe the same. If the first step was inconclusive, the second has to decide the question. If this is still not possible, it is best to have the client walk around a little to come together and find his natural stance again. Different images need to be offered to the clients sometimes to tune them in to the subtlety of the movement desired.

For the tilt and side-tilt it is helpful to ask the client to come up a little first by extending against the ground. He then keeps his upper body high and imagining his pelvis to hang down from it as a kettle on its chains from the roof of the fireplace he will sense the direction the pelvis swings into. For the translatory shifts he is asked to let the weight of the upper body settle down on the pelvis and to notice in which direction it is squashed out between trunk and legs.

For rotation, I ask the clients to bend slightly knees and hips and to shift the weight on one leg without the change being noticeable for an outside observer. The weight stabilizes the sacroiliac joint. Then the hip on this side is let go into a forward swing taking the upper body along passively. The side which swings easier and carries farther indicates the rotation of the pelvis. The knees can also be locked tightly, the pelvis pushed forward, which locks the sacroiliac joints. Then the hips are let go to swing forward alternatingly without softening knees and pelvis. This procedure has the disadvantage of involving rotational preferences of all the segments which obscures the situation sometimes.

Torsion is determined by palpating the anterior and posterior superior iliac spines simultaneously with both hands from the back. Torquing the hands slightly in both directions helps with determining the actual torsion. It is usually more obvious with the client sitting on the bench. It can also be tested functionally by shifting the weight completely on one leg and then letting the *other* relax, the knee swinging forward and slightly inward. The easier movement is on the anterior torsion side. If one is not very clear about the mechanics, there arises confusion easily. So it happens frequently that inadvertently torsion is tested instead of rotation if the sacroiliac joint is not securely locked.

There is no functional test for the internal or external configuration of the pelvis. Moreover, solely inspecting the pelvis may lead to errors because the soft tissue can mask the skeletal arrangement. So in practice one may simply go from

the tilt and shift along the z-axis and determine from there whether the intrasegmental configuration is congruent or not.

Patterns

Observation reveals that the seven parameters break down into two systems which are independent from each other. One is bipolar and consists of three related parameters. The other seems to be unipolar and comprises the other four parameters.

Bipolar System

The *internal* pelvis consists of

- intrasegmentally: internal configuration
- intersegmentally: anterior tilt
  posterior shift

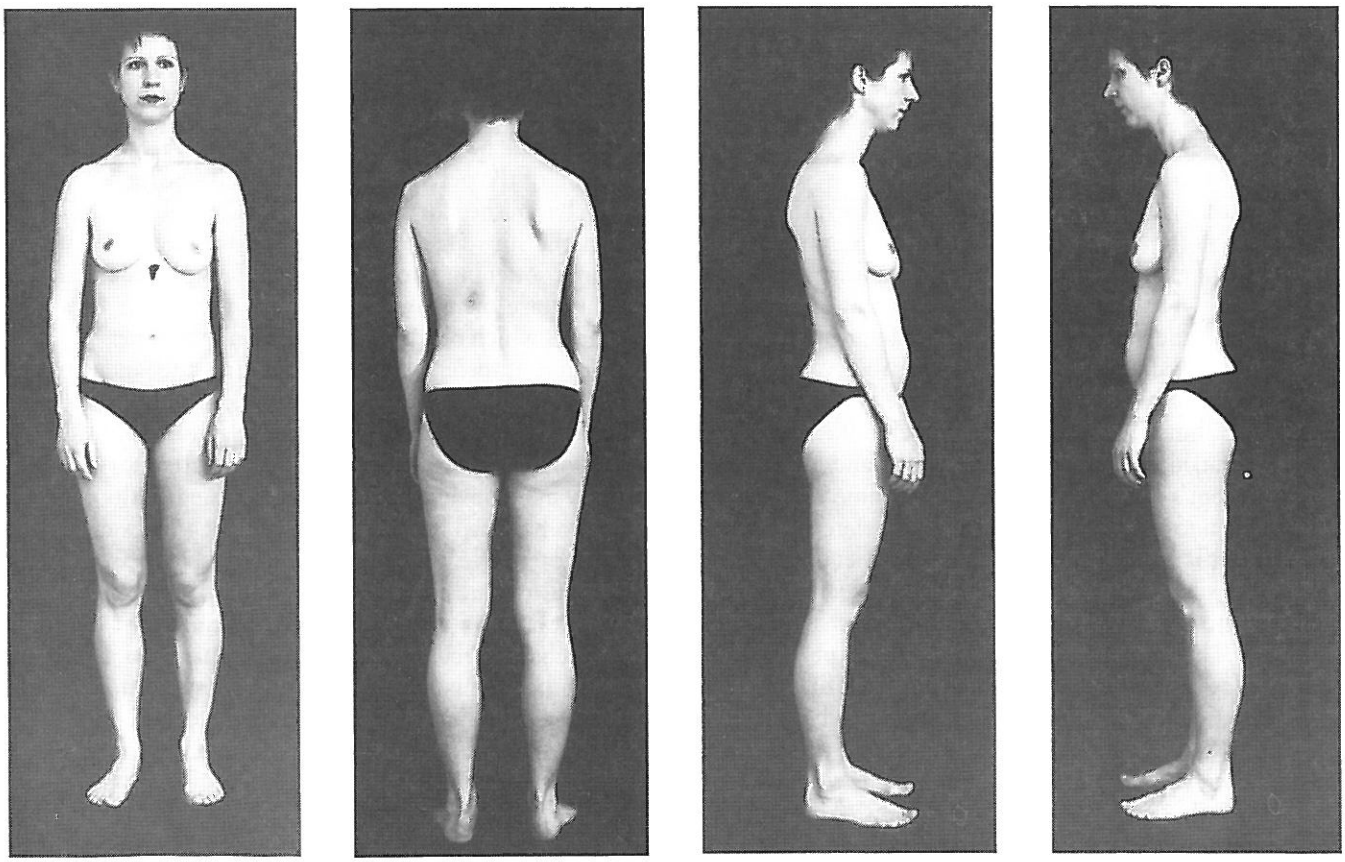
The *external* pelvis consists of

- intrasegmentally: external configuration
- intersegmentally: posterior tilt
  anterior shift

The terms «internal» and «external pelvis» are used in a broader sense including: the same terms in the strict sense of denoting the intrasegmental configuration plus two intersegmental parameters. The nature of craniosacral movement is first a cyclic shift in the arrangement of the cranial bones. It transmits to analogue cyclic movements of the vertebrae and the intrapelvic architecture. They are intrasegmental events. In the pelvis, the flexion phase leads to a tilting back of the base of the sacrum which in turn induces the ilia to rotate externally or anterior. The intersegmental movement can be understood in such a way that the craniosacral movement coming from inside induces a tendency into the whole of the segment to go along with it. In the flexion phase, the posterior tilting of the sacrum would then drag along the whole of the pelvis into a posterior tilt.

A reasonable speculation on the genesis of the internal and external pelvis could look like this: first we would have a disposition toward internal or external configuration in what will later become the bony pelvis. This tendency could be set by hereditary factors and the intrauterine pattern of mechanical stress. The craniosacral movement which begins early in the life of the embryo or fetus would reinforce the structural bias already present just as a river washes out its bed in the direction set initially. Gravity would then act on the structural preference so established with increasing vigour and in steps: first at birth, then when the baby sits up, finally when it stands up. The intersegmental parameters would be determined relatively late in the development. This would mean that intrasegmental shape is imprinted «deeper» in the structure than tilt and shift. The view is supported in practice by the experience that it is much easier to reverse the tilt or the sagittal shift, structurally by changing the fascial web as well as posturally. Of course each of the two lines of development

Ill.3 Standard internal pelvis.



are subject to modification or even reversal at any point along it through various factors.

The existence of the two patterns makes it likely that the intrasegmental type determines the tendency of tilt and shift. So an internal configuration would predispose to an anterior tilt and a posterior shift, an external configuration to a posterior tilt and anterior shift. The mechanics of this are not very clear but may eventually be understood by examining the sacrum and its suspension in the fascial network of the body more closely. In any case, the terminology proposed is such that an internal pelvis in the narrow sense designates the internal bony pelvis. The internal pelvis in the broader sense means then that this internal bony pelvis is accompanied by an anterior tilt and posterior shift. This could also be called a congruent internal pelvis if Jan Sultan's term may be extended in this way[4]. An internal bony pelvis with a posterior tilt or an anterior shift or both would then be a conflicted internal pelvis – and need specification of the conflict.

Unipolar System

The large majority of the clients shows the following combination of the other four parameters:

- intrasegmentally: right anterior torsion
- intersegmentally: left anterior rotation
  right side-tilt
  right side-shift

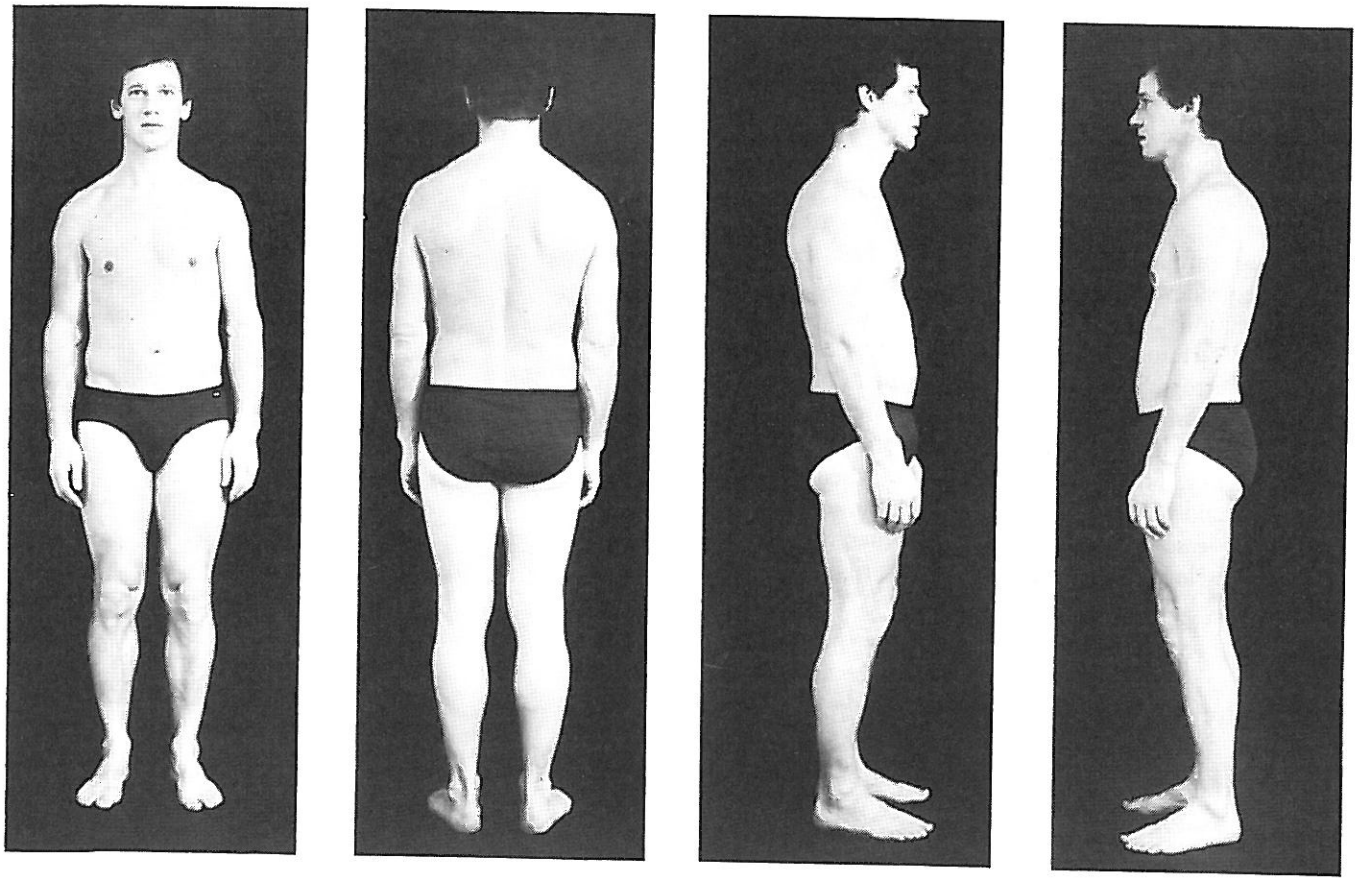
[4] Notes on S.I. 86/1: «Towards a Structural Logic».

This system seems to be entirely independent from the bipolar one. It is noticeably different in character, too, because a symmetrical pattern where all the four parameters are reversed does not seem to exist. This combination of parameters could therefore be called «standard». Any one or more parameters deviating from the pattern would constitute an «irregular» pelvis – and need specification. So a «standard internal» or a «standard external» pelvis would define all seven parameters. A «standard conflicted internal» or «standard conflicted external» would mean that the pattern of the bipolar system is incomplete. An «irregular internal» or «irregular external» pelvis would indicate a disturbance in the pattern of the unipolar system. Finally, we could speak of an «irregular conflicted internal» and an «irregular conflicted external» pelvis. All terms except the first two would need specification.

Conclusion

The functional tests used for determining the structural parameters, the «coordinates», seem convincing theoretically and offer a sharper diagnostic tool for recognizing the «structural state» of the pelvis. This helps decidedly in the practical work when one is to formulate the concrete intention for how to normalize the pelvis. But it is of course desirable and necessary to further examine whether the tests actually measure what they are supposed to measure. It seems also necessary to establish a sufficient interreliability, which

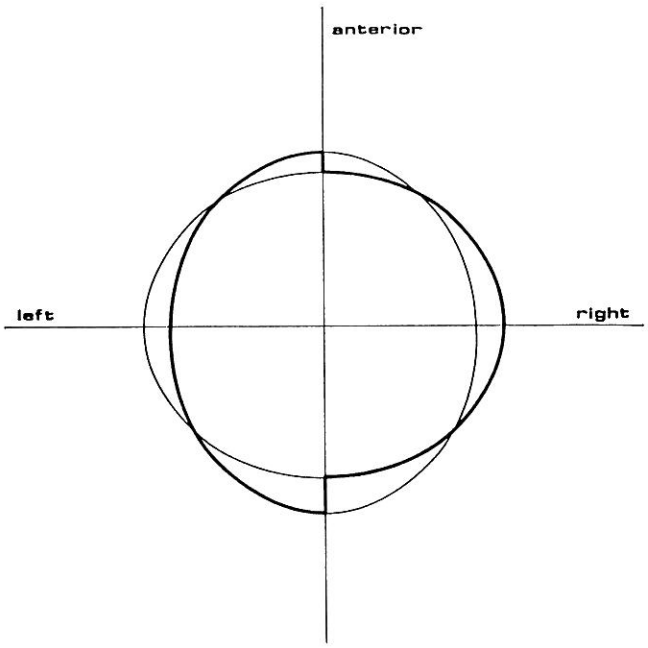
Ill.4 Standard external pelvis.



would be given if several observers came to the same diagnostic conclusions concerning the same clients.

An interesting result concerns the reliability of the line between the tip of the coccyx and the tip of the pubic bone as an indicator of tilt. Numerous objections can be raised against this criterion. They rely mostly on the wide variation in the position and shape of the coccyx. But in the majority of cases the line corresponds to the functional test. In some cases I was uncertain, but the decision became clear when the client let go of the pelvis in front and in back (functional test). There never was a clear discordance between the the palpatory finding and the functional test.

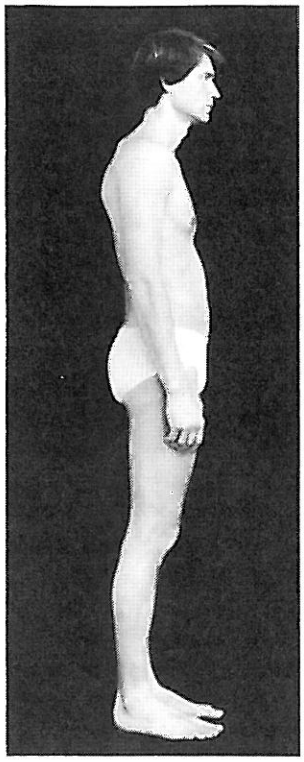
The most interesting feature of the patterns described, however, is the fact that they are not one-dimensional but comprise parameters of both the inter- and intrasegmental level. This corroborates the theoretical speculation that the different levels are closely interwoven concretely. As for the practice, it leads to the view that e.g. an anterioir tilt can only be normalized up to a point which is given by the degree of «internality» of the bony pelvis. And in cases of an «irregular» or «conflicted» pelvis it underlines Jan Sultan's discovery that besides adapting structure to the gravity field it is sometimes important to harmonize it internally first.

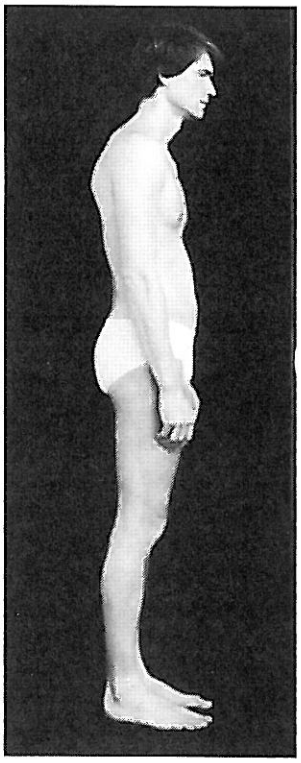


Ill.5 Projection of pelvis on the horizontal plane showing the halves of two differently oriented ovals.

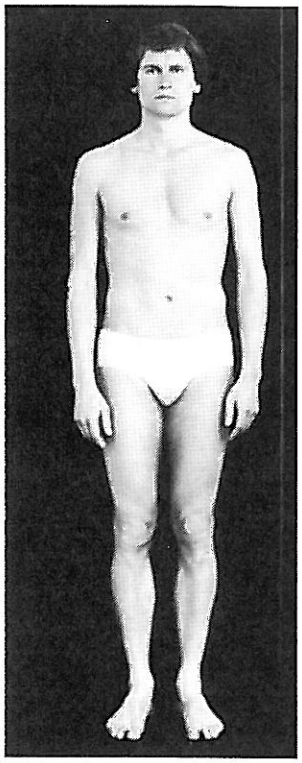
If a still broader view is adopted, the underlying level of the shape of the bones and the overlying functional level also come under consideration. As for the bones, the external pelvis tends to be broad and flat while the internal one is narrow and deep. The projection of the pelvic block on the horizontal plane approaches an oval with the long diameter transverse with an external configuration and an oval with a long sagittal diameter with the internal configuration. The anterior torsion side goes more toward the external type; the posterior torsion side resembles the internal type. The combination tends to make the right half of the pelvis look broad and flat, the left half narrow and deep in the standard pelvis. Because this leads to a different pattern of tensional and compressional forces acting on the two sides of the bony pelvis, it could be surmised that the bones develop different shapes also. Closer examination of the bony pelvis (Ill.2) suggests an impression of the left side being under compression from lateral and expanding in the sagittal dimension, of the right side being compressed from front and back and expanding more freely sideways.

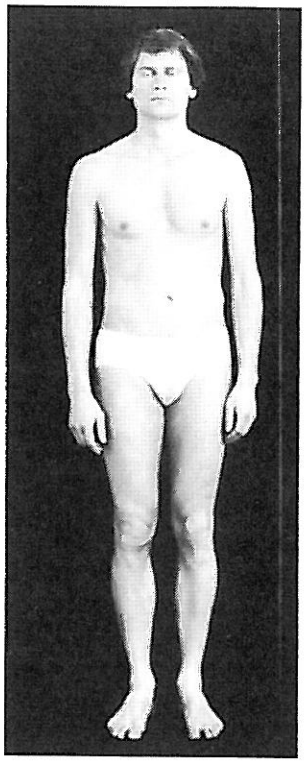
The functional level must not only be considered because function determines structure but also because it can lead to diagnostic errors. So the pelvis may appear to be shifted to the right side in a standard pelvis, but it can also be pulled over on the left leg as a postural compensation of the structural tendency. This is especially the case when people attempt to stand very straight, exaggerating the «erectness» at the cost of «ease». The functional test – when they let go – will then disclose the structural shift to the right side.





Ill.6 Standard external pelvis – with conflicting thorax – demonstrating postural changes of tilt with little effort.





Ill.7 Postural variations concerning side-shift.

Peter Schwind

minisession number two

the minisession consists of seven interventions each of which should not last longer than one minute.

Structural Analysis

The man has had a basic series of Rolfing (10 sessions), three additional sessions, a series of 5 «advanced» sessions, and some problem-solving work related to the use of his hands as a musician. He has received this work over a period of three years. The following comments are based on observations made during the minisession, which were taped, and on picture evaluation after the session.

There are some torsions and rotations in the deep compartments of pelvis and thorax; and there is a critical situation at the transition axis-atlas-cranium.

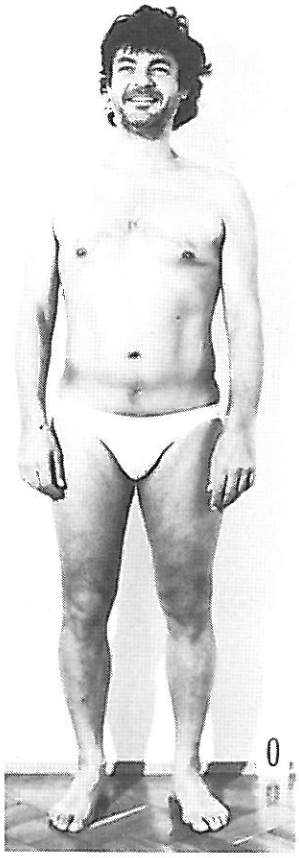
Pelvis: right anterior torsion combined with left anterior rotation. This leads to a different weight distribution on both feet and is correlated with a spatial difference in the tissue arrangement of the adductors.

Thorax: compression of the posterior thoracic area, rotations at the level of T7/8/9.

Neck: contraction of the atlanto-occipital membrane, atlas rotation and sideshift of the head in relationship to the central vertical line.

Structural Diagnosis

The three compartments pelvis-thorax-neck/cranium are directly correlated in their spatial arrangement. This can be seen in the front view: a lack of horizontality of the pelvis is congruent with the side-shift of the thorax, the left part of the thorax follows the rotation of the pelvis, the shoulder-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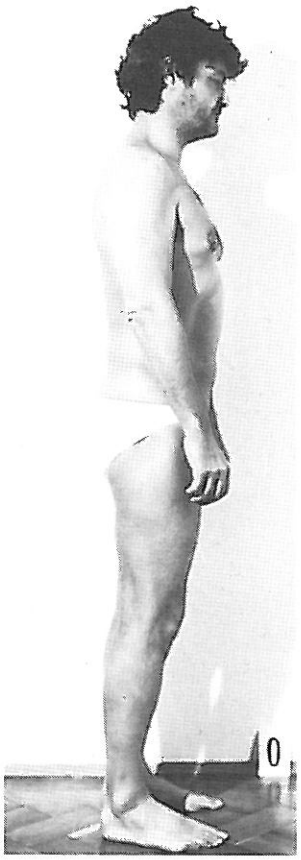
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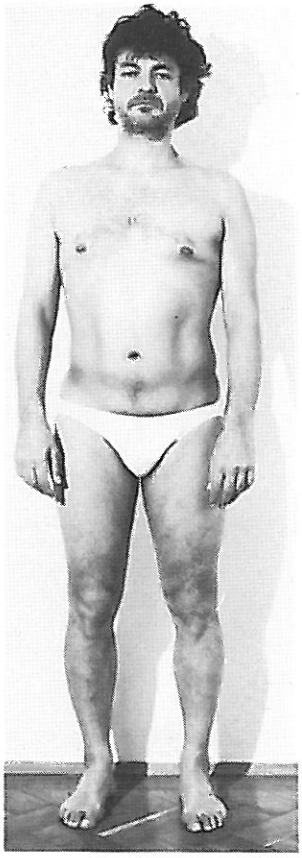

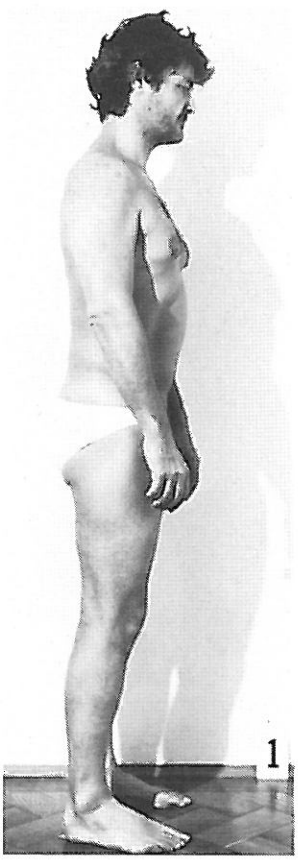
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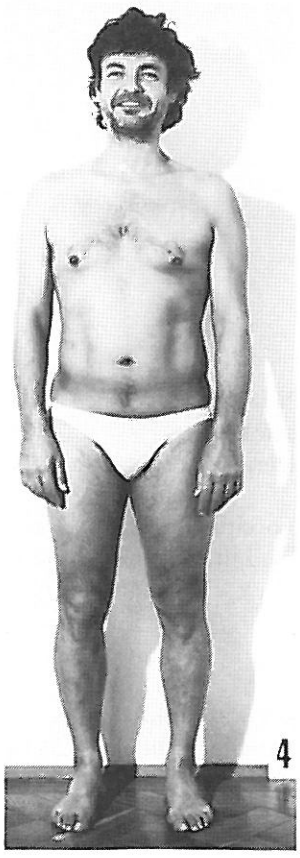
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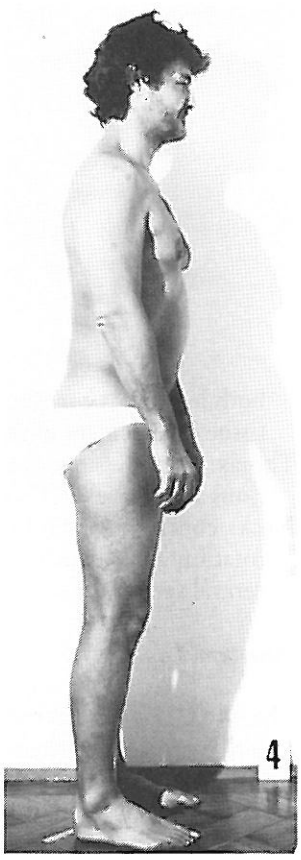
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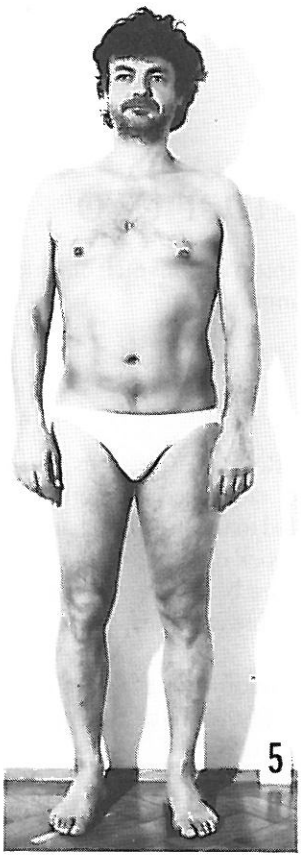
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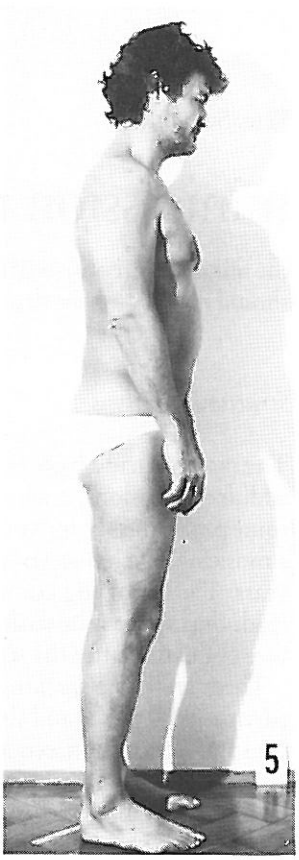
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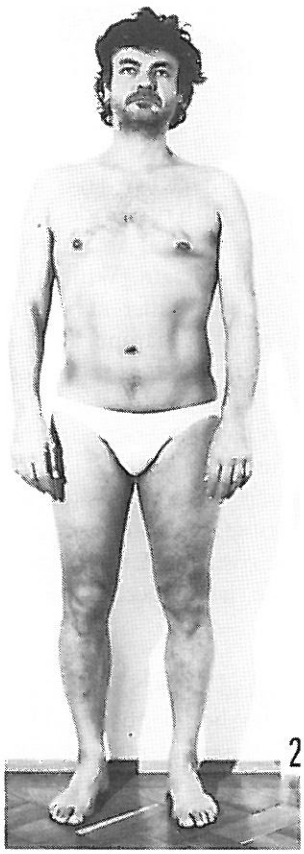
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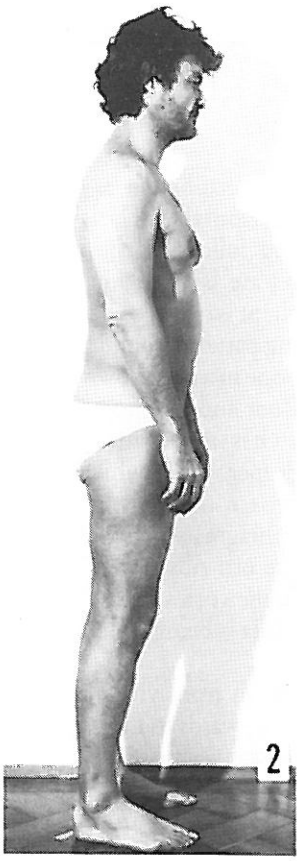
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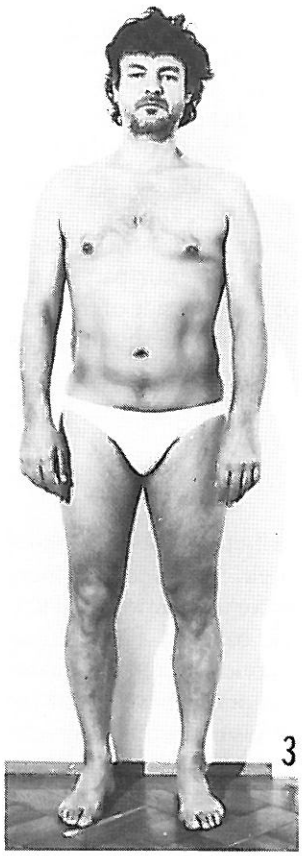
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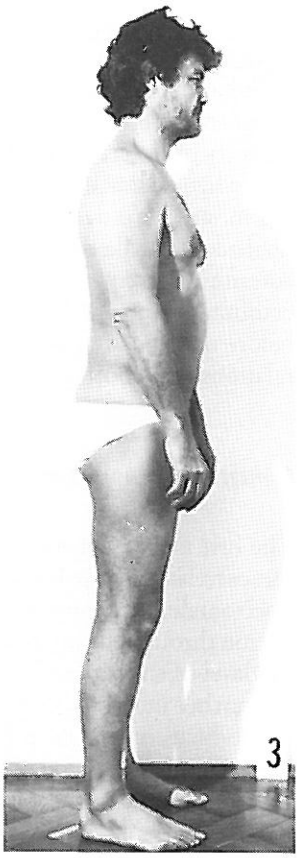
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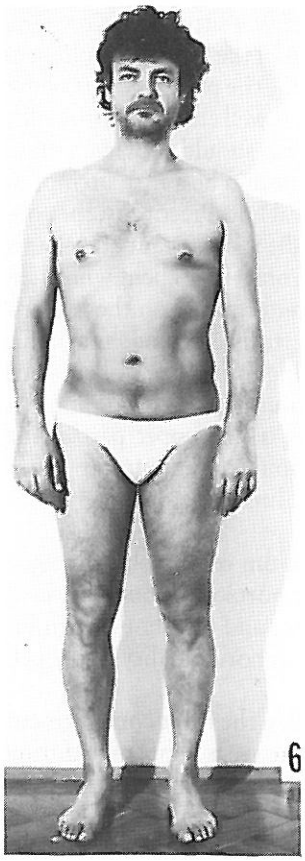
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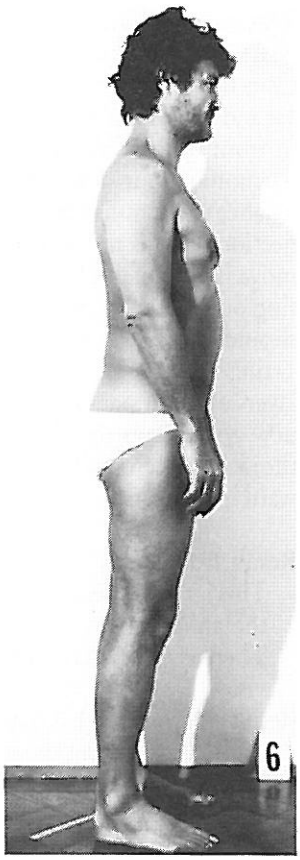
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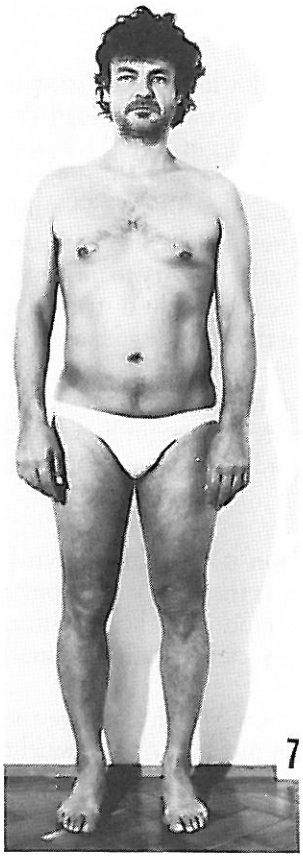
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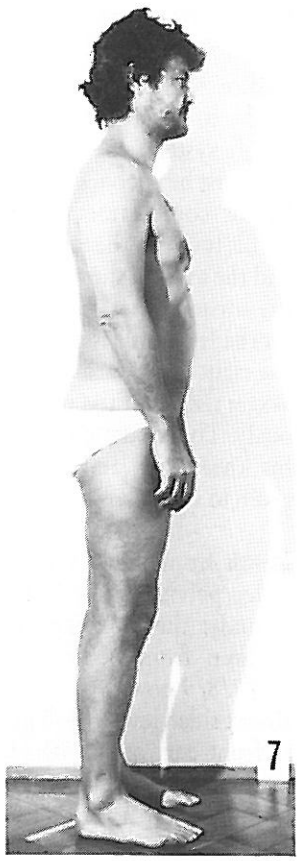
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girdle and arms follow the thorax, and the head follows with a subtle displacement to the left side. While the legs and feet seem to compensate the pelvis/torso structure quite well, the neck has to take more control of the static system than it is designed for. This can be seen clearly in the side view: the anteriority of the cranium is fixed in two ways – by a shortness of the hyoid sling downward to the sternum (layers around the m. mylohyoideus, m. sternohyoideus, and left m. sternocleidomastoideus), and through the m. digastricus venter anterior and venter posterior to the posterior part of the cranium. (Compare the contour of the *front* side of the neck before one and after seven, and compare the shoulder/jaw relationship in both pictures in the side view!)

Concept of Manipulation

The first move is an attempt to verify the hypothesis about the correlation of pelvis-thorax-neck. It tries to give more horizontality to the pelvis and aims for a better weight distribution through the legs (left-to-right balance). The result on the level of the thoracic and the cervical area might dictate the further moves. I expect that one of the moves following has to focus on the deep ligamentous or membranous elements around S3 and another around axis-atlas-occiput (see picture zero side view). The goal of the seven moves is: more horizontality of the pelvis, less side rotation on the level of T7/8/9, decompression of the atlas-axis-cranium relationship.

The principle is in practice: each of the three critical areas is to be affected only so far that the two other areas follow positively towards a clear arrangement around the vertical line.

one

To horizontalize the pelvis, the following consideration is made: to get a significant shift which travels through the whole system, the manipulation has to involve the legs, it can't just be «pelvic» work. In standing upright, the right adductor compartment is arranged a little more backward. While lying on the table, the rotation of the pelvis disappears and the torsion shows up more clearly. Let's try to influence the torsion/rotation *and* influence the weight distribution on the legs. This is done by going through the adductors of the right leg towards the trochanter minor and going to the «extra tissue» of the upper part of the left iliacus simultaneously. The model uses light pressure of his right heel. With his knee rising and rotating inward, a diagonal fixation is given to the pelvis.

Result front view: torsion/rotation is very little affected, leg/pelvis relationship changes as the right femur comes under the hip. The head goes more into the side shift. (Seen from behind, there is a clear rotation around T7/8/9 now.)

Result side view: the diaphragm is not as high anymore, the front part of the 5th rib comes more down, the weight shifts to the heels, and the shift around the hip joint affects both the relationship of thigh/calf and the spinal curvature. The latter affects the relationship neck/thorax: the neck appears to be more coming out of the thorax. The discontinuity between neck/cranium is more visible.

two

The diaphragm is now used as the reference layer for horizontality. The layers in front of the 11th rib are touched, and following the client's breathing motion, an indirect release is done for the respiratory diaphragm. While the client is on his back, the result shows up in a different breathing pattern around the 1st and 2nd rib. The manipulation is done in a very slow way which is designed to affect the pelvic floor and the thoracic inlet as well. Additionally, the costal arch is treated with subtle pressure to allow for a release of the deeper layers which cannot be touched directly. This approach comes from a bilateral touch which affects the diaphragm as well as the connection of serrati/obliqui around the 6th ribs. (That means that the costal arch is used as a framework of the diaphragm, while the connection to the axilla is being influenced.)

Result front view: the rotation around T7/8/9 has shifted upwards to the upper anguli of the shoulder blades. This was verified in the back view. So the problem has shifted upwards, the side-shift of the cranium is very clear now.

Result side view: the front dimension of the neck is showing more ease both in relationship to the sternum and the mandible. The posterior compartment around the 1st and 2nd ribs offers a new base for the neck/thorax relationship.

three

This move is done with the client in a sitting position. The goal is a paradoxical one: the front of the 5th rib should continue to sink down a little bit, while the posterior part of the 1st and 2nd rib should sink down as well creating an inner lift in front of the thoracic spine. This should provide a more harmonious curvature of the spine and be a first attempt to balance the cranium on the vertical line. Practically, the connection of arms and shoulder-girdle is important during this move. The Rolfer is kneeling in front of the client who is sitting on the bench and has his hands resting on the Rolfer's shoulders. The client is working with a weight shift on his sitting bones, using the hip as a hinge, while the Rolfer opens layers on both sides of the latissimus dorsi. While doing it, a new goal shows up: the opening of the upper part of the thoracic spine could help the shoulder-girdle to move forward in relationship to the lateral line.

Result front view: the neck/cranium relationship changes. This is the expression of better horizontals on the level of the ankle hinges, the hip joint, and the shoulder-girdle. There is a minimal shift towards horizontality in the pelvis.

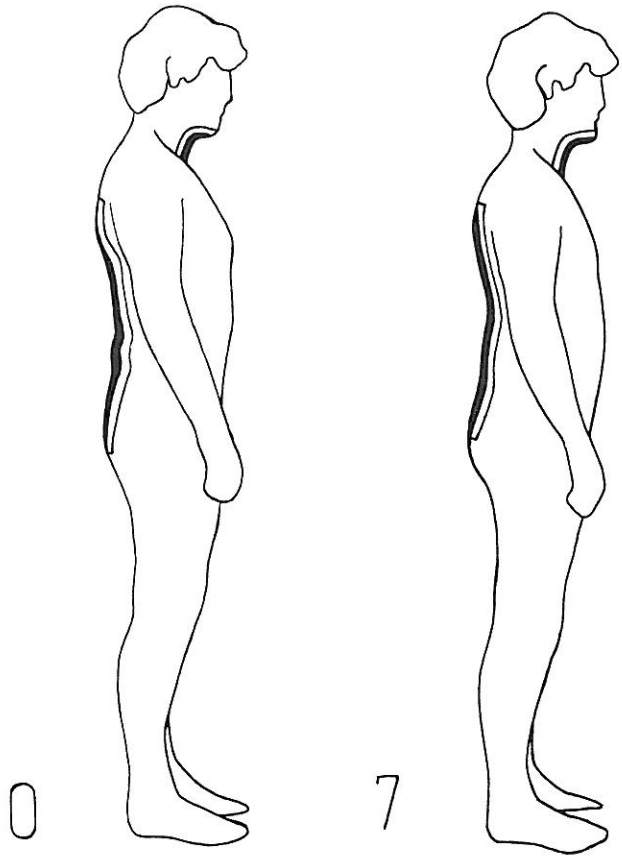
Result side view: what happened in the front compartment of the neck during the second move is happening during the third move in the posterior compartment of the neck. The distance between upper ribs (front) and mid-cervicals is affected.

four

Seen from the back, the medial contours of the shoulder blades are less visible. Now a unilateral move on the back will be made below the center of the thoracic rotation on the right side of the back, close to the lateral margin of the erectors. The support of the model is used in a way which guarantees length in the front of the spine, while all the three arches of the foot are in good tone, and the thighs avoid further medial rotation. This move is done from a perspective which risks a development to the worse of the pelvis and the atlanto-occipital junction.

Result front view: there is a better arrangement of the thoracic area around the center line of the body. However, some of the torsion comes back into the pelvis, and the weight distribution on both feet is less even than after three.

Result side view: the shoulder-girdle is more above the thorax and hips. The thoracic curvature appears to be longer now, probably an anteriority of T7 is resolved.



five

Up to now, the manipulations could only give an improvement of the front-back balance. The changes which one can see from the front (and the back) might not be stable. There has to be a change in the perspective now to avoid chasing around rotations. Certainly move five and move six are a unit as they both focus on both ends of the spine in a way which should give the pelvis horizontality and balance the atlanto-occipital junction. I work on ligamentous structures on both sides of the coccyx with one hand, the other is holding the two spinae anteriores superiores. I try to establish a contact to the «inner dimension» of the pelvis through the sacrum, while a subtle «closing» of the two spinae allows the base of the sacrum to sink backwards. It may sound funny, but I'm after a better inner flexibility of the segments of the sacrum. This work uses approximately 10 to 40 grams of pressure. The sacrum is treated like a broad fish (sole) which is floating around. Now I give a little pressure to the right spina anterior, follow the torsion first and then guide the pelvis out of it. That kind of manipulation requires sensitivity as one hand is handling the rotation of the pelvic block and the other hand is trying to handle the torsion of the two ilia. This looks like an elegant version of a pelvic lift: my hand feels that the S2-S3 relationship opens, and we see a different pattern of breathing. The base of the sacrum is sinking back, and I change the direction of pressure now (the fingers on the side of the sacrum, the palm holding the sacrum) to create a little more ease in the lumbar curvature. Finally, I have to get my hand out without messing up the subtle changes. This situation is similar to the one we have with pelvic lifts in cases of a posterior pelvis: the hand has to sneak out while the fingers give a light diagonal impulse towards the umbilicus.

Result front view: again less torsion in the pelvis.

Result side view: the base of the sacrum is coming backwards in relationship to the ilia.

six

Now we have to be careful. At first I wanted to do deep neckwork around the scaleni, now I'm afraid that this might cause irritation or side-shifts in the thoracic area again. I change the approach once more: while the model is on his back, I want to try to influence the upper thoracic layers and aim for an opening of the atlanto-occipital membrane. My fingers touch layers between the posterior part of the first two ribs, with the occiput resting on my forearms. The occiput remains in that position, and I establish contact with the ligamentum nuchae. Now I see the «core» of neck and thorax like a «clothesline», and the vertebrae are hanging like pieces of linnen from this clothesline. I have two ends of the «line» in my hands: ligamentum nuchae and lower connection of the trapezii. And in a way, I create a new order of the pieces of linnen. This whole action is an attempt to bring the improvement of the pelvis and back structure up to the level of axis-atlas-cranium. Some precision is required to avoid a renewal of pelvic torsion and thoracic compression/rotation.

Result front view: the shoulder-girdle balance is acceptable; however, there is a certain instability showing up which I can't describe exactly.

Result side view: the atlanto-occipital junction has opened. (This has to be proved by palpation.) There is the impression of «lift» *and* a certain instability. Maybe that the LDH has a tendency to come forward again?

seven

First I wanted to leave the situation as it was and hoped for a completion by itself. Finally, I followed Hans Flury's suggestion – who insisted on the format being kept – to do «tracking» work. This might give better support from the legs, bringing them under he pelvis. Moreover, this might uncover the pelvic torsion again! This last move is done with the model standing up. While the upper margin of the pelvis sinks backwards, the hip joint goes into flexion, and the torso comes forward.

Result front view: some of the critical expectation about the pelvic torsion turns out to be true. The lower parts of the legs work better for support of the hip, the side shift of the head is diminished.

Result side view: to get a clear picture, I have to compare photos 0 and 7. The main shifts are: the lumbar curvature appears to be longer, the pelvis has improved in horizontality. Some effects can be seen at the levels of the thoracics and the neck.

Closing Remarks

The front view after seven shows a certain incongruency between the legs and the lower abdomen. This has to do with the tendency of the femora to rotate internally and a hidden tendency toward hyperextension. This might lead to a follow-up session which should focus on the legs.

The question is whether this minisession has offered a new quality of prevertebral and postvertebral balance.

Commentary

The analysis is mainly in terms of lateral displacements from rotation of the pelvic, thoracic, and cranial segments and the consequent disturbance of the respective horizontals. The after 7 picture shows that the structure has improved on all three counts. In addition, the knee and ankle lines are also much more horizontal.

The client shows the signs of having had much bodywork. The contours are soft but the body is differentiated, and there is that impression of iridescent deflections of planes and slight turns in the direction of lines which is characteristic for bodies which have had a lot of work. They represent superficial conflicts which can easily be reversed posturally and which make it so hard to filter out the structural. That the work has been structural is evident from the postural variations and compensations being in the service of manifesting a central vertical as the organizing principle.

From the point of view of support it appears that the vertical is slightly slanted towards a diagonal from the left foot to the right thoracic apex. This line of support is tensed and bent anterior convex with the most anterior point in the middle left abdomen, which would correspond to an anterior left 12th rib. The pelvis with its left anterior rotation is already a little back under it. The left knee is hyperextended and so this leg drops back more. Above, the right side of the thorax pulls up and back to complete the «tension bow». This diagonal is external, at least posturally, with the left lower leg in light conflict. The other diagonal is internal with also the right lower leg somewhat conflicted. As it is relieved of part of the weight bearing and stabilizing duties, it hangs off the supporting diagonal relatively freely.

When considering the vector path of the weight it appears to part at the pelvis relatively far to the outside of the legs. This is corroborated by the relatively wide stance of the feet. The deviation is more marked in the internal right leg which seems to be shifted out and back as a whole with the typical «ledge» showing in the back of the iliac crest. In the left leg, the vector path runs less far out through the groin, and its deflection to the outside is by the external rotation of the leg which comes from the bow leg type.

The aspect of core/sleeve shows a shortness of the core which manifests in its rotation. The S-shaped curve is left convex at the pelvis, right convex through the middle of the trunk as expressed by the upper linea alba and the lower sternum, and again left convex in the neck. Deep restrictions seem to be present in the left psoas with consequent shortening across the left groin and in the right side of the diaphragm. In the middle layer shortness can be suspected in the back along the right side of the spine, in the external transmission line, and in front at the level of the ribs which hold up the thorax in the inspiration phase. This holding in the chest in combination with the broad and thick rectus abdominis, representing superficial shortness, is effective in compressing the core. But it is remarkable that the pectorals and the shoulders are relatively free. The right shoulder seems rather carried back up a bit by the thorax than participating in the dynamics of balance. The external rotation of the humerus which goes with it is compensated at the right elbow.

The traditional approach to such a structure would be to build it up from the ground if no undue holding farther up «promised» to block the release from below. At the feet, attention would be given to the heels which are drawn in and the high subtalar complexes which throw the weight outside. The hyperextended left knee would be addressed. The right leg would be brought under by releasing the fascia lata from the tensor and the gluteus medius as the most prominent pieces of the pattern. The left femur would be derotated mainly by lengthening the adductors. It would then have to be seen whether the core would take up this length or react by further shortening in the case of the restrictions not being resilient enough. It is interesting to see that the different approach chosen has brought the feet more together, the right thigh in a little, and has derotated the left femur. The left knee is about to let go of its hyperextension. The ankles still don't allow the weight to pass through them freely, and the heels do not permit to spread it back as they should. The adductors of the left leg are still short but now show the effect in pulling down the left ramus ossis pubis. The pelvic torsion shows up more clearly afterwards, which lets one assume that the better positioning of the pelvic block has eliminated some intersegmental compensation.

Of course, Peter has chosen the opposite approach by working from the pelvis up. The effect has travelled down into the legs partly. Stops are at the ankles and, partly only, at the pubes. There, the weight vectors into the legs run a smoother path closer to center, but there remains some

shortness at the rami which should prevent moving through them freely. The most obvious gain is in the length through the midbody by the diaphragm release (move 2) and the derotation of the right side of the thorax (moves 3 and 4). And this length has let out the head dramatically which seems to play a steering and controlling role with the model in almost an Alexander fashion.

Closer scrutiny of the sequence shows an interesting development which is paralleled by the facial expression of the model. After the first move, the left thigh is converted to internal. This is enhanced by the second move which as the most striking effect seems to have released both legs from the diaphragm. This breaks up the «backbone» of the system, the tensed anterior convex supporting diagonal. After 3, the upper part of this «pillar» also starts to tumble, and insecurity and disorientation are at their maximum. After 4, the situation is resolved in a new way: the right side of the thorax has given up completely, the whole thorax has disengaged from the head, and the trunk has settled on both legs evenly. This constitutes a different structural pattern and so move 4 should be considered to have brought about a qualitative change. The rest of the moves is quantitative improvement of the newly established system which rests on both legs now. The last move is unfortunate in that it seems to open up a new level of deeper imbalance at the pelvic floor. But this does not threaten the new pattern because the body does not go back to its former «method of the supporting diagonal», nor does the upper body follow down on the left leg. It balances the disturbance out in a new way, by shifting slightly over the right leg.

Hans Flury

Walser/Wagner/Flury

Technical Catalogue

The techniques are described outside the context of integrating the whole. They must not be used this way but only if properly indicated by that context. They can otherwise introduce disorder into the structure instead of order.

M. Obturator Internus in the Side Position

The m. obturator internus is often the key structure for the rotators[1]. It originates from the inside of the membrana obturatoria and the bone encircling the foramen obturatorium and slants back and narrows towards the foramen ischiadicum minus, which is formed by the ramus ossis ischii anteriorly, the lig. sacrospinale cranially, and the lig. sacrotuberale caudally. There it exits the pelvis by turning around the ramus in back, and taking a lateral direction it inserts with a long tendon in the fossa trochanterica. Its extrapelvic portion is flanked by the two mm. gemelli. This trio together with the piriformis are the main external rotators for the femur.

Signs for a shortened obturatorius internus are: an externally rotated femur with genu valgum (X-legs), a flat gluteal region, a posteriorly tilted pelvis, and the posterior torsion side of the pelvis (ilium rotated back). These signs are typical for the external type[1].

[1] Jan Sultan: «Towards a Structural Logic», Notes on S.I. 86/1, and personal communication.

In the side position with the lower leg extended and the upper leg flexed, the obturatorius internus of the lower side is reached from medial and below. After palpating for the angle between the ramus ossis ischii and the tendon of the semitendinosus just in front of the ischial tuberosity, the fingers slide over the ramus inside the pelvis to reach the muscle which is normally thick and flat. Going up and back in the direction of the corpus ossis ischii, the obturatorius internus is followed to the critical place where it crosses the ischium on the inside and turns out around the back of it. The shortened muscle is thin and rounded and lies more caudal in the foramen ischiadicum minus. It tends to be glued down to the bone, and the tissue can then not be moved easily.

Freeing the tissue from the bone and lengthening it is helped by two kinds of movement. Passively, the lower leg is taken back – the knee is now flexed – and rotated medially to prestretch the tissue. Releasing the leg and lifting the foot around the knee as the fulcrum rotates the leg externally and releases the tissue. Alternating between internal and external rotation eases the going in to the turning point of the obturator internus and helps with releasing the tissue with the other hand. Actively, the client alternates between going into an anterior pelvic tilt and tilting the pelvis back – aided by raising the knee of the upper leg more –, and the tilting back opens the area in a more general way.

With internal types, where the obturator internus and the other rotators are often overstretched and in secondary

shortness, the tissue is made more resilient with the technique. There of course the primary objective is the tendon of the iliacus which can be reached in this position at its insertion at the lesser trochanter. The side position has some advantages over the usual prone position: the obturator internus is more superficial and available, the approach does not interfere with the n. ischiadicus, active and passive movements are easier, and the firm ground on which the hip rests provides stability for the area. So for the 70% of muscle mass that lie inside the pelvis this approach is a viable alternative.

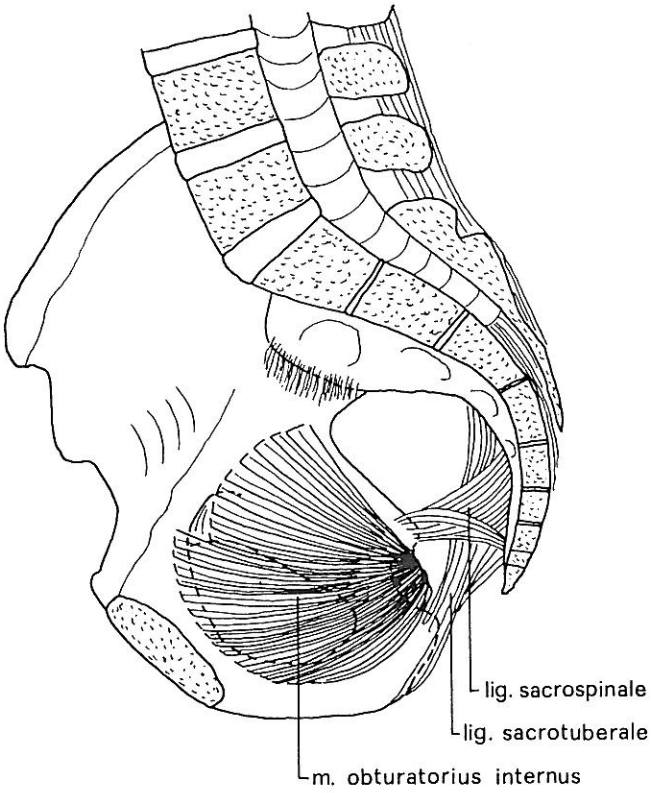
Thomas Walser

Lengthening the Hamstrings with an Eye to Leg Movement

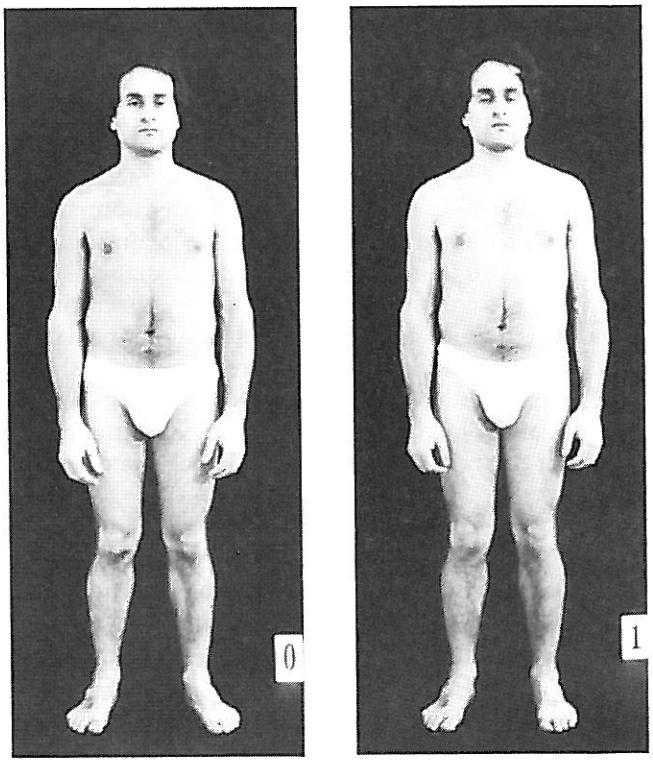
In our culture of thrones, chairs, car-seats, and even toilet-seats, hamstrings tend to be chronically short except in people who consciously do stretching exercises. This shortness is due to the connective tissue of the muscles. The collagenous tissues develop their form according to the mechanical forces they are exposed to. In a tissue that hardly ever has to lengthen they will adapt to this reduced range of motion, grow short and thereafter seriously impair the normal range of motion. Thus hamstring work in our culture normally is lengthening. Beyond this well-known fact, how do hamstrings figure in our analysis of structure? I shall state some hypotheses.

1. In a balanced structure – if you look at it from the sides – the rectus femoris and the hamstrings run nearly parallel to the central vertical line which coincides with the femur. As antagonists the two can neatly balance the os coxae.
2. In an external type, the pelvic block moves forward while the thoracic block bends back creating the familiar banana form. The weight of the structure is kept up against gravity by the muscles in front: amongst others the rectus femoris and the quadriceps creating an overextension in the knees. As a result the antagonist hamstring compartment slackens and its points of attachment at the ischial tuberosities and – around the epicondyles – to tibia and fibula are brought closer together. As the connective tissue adapts to this situation the already short hamstrings become even shorter in a passive rigidity which Hans Flury calls «primary shortness» and which I suggest to describe as «passive shortness».
3. In internal types, the pelvic block moves backwards while the thoracic block collapses forward creating the characteristic deep lumbar lordosis. In such a structure the weight is kept up against gravity by the muscles in the back: amongst others the hamstring compartment. Now the hamstrings have to contract actively and keep the pelvis from going into an even more pronounced anterior tilt. If the tissue around the knees is weak, this constant tension in the hamstrings pushes the femoral epicondyles forward on the tibial condyles like a drawer of a chest. If the connective tissue around the knees is strong, the hamstrings are longer than in a balanced structure because the anterior tilt of the pelvis brings the ischial tuberosities up (cranial) and back. So – except in persons with chronically flexed knees coupled with a pronounced anterior pelvic

Ill.1 View on the side facing medial of the right side of the pelvis (from Sobotta).



Ill.2 Before and after obturator internus technique.

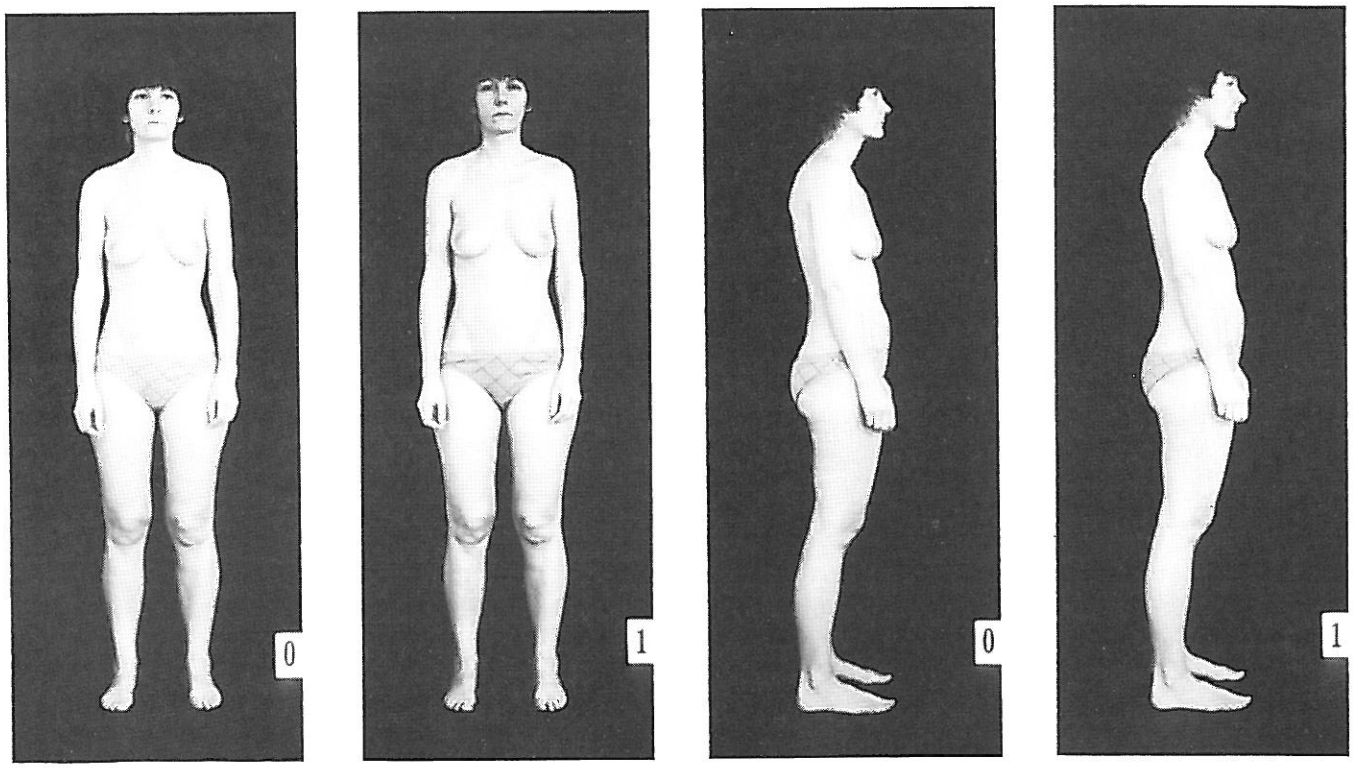


tilt – the hamstring compartment will be long but rigid from holding, which increases the density of collagenous fibers and decreases the metabolic exchange of fluids in the interstitium. Hans Flury likes to call this active rigidity «secondary shortness» although the fasciae may be longer than they should be. I prefer to call it what it is: «active tightness». If this tightness can be resolved by lengthening the already long compartment, this would allow the tibia and fibula to come forward under the pelvis, relax the passive shortness of the antagonist compartment, and contribute to a more horizontal pelvis and the first experience of lift because the structure is supported more evenly from below.

4. In a balanced structure, in bending or bicycling, the knees should be able to follow a straight course easily. The medial and lateral hamstrings share practically one origin at the ischial tuberosity, which permits relatively wide movements at the hip joint to have little influence on their tone. Their insertions are however farther apart, the line between them forming the base of a triangle with the tip at the tuberosity. Any one-sided shortness on the medial or lateral side of the triangle will definitively influence the position and function of the knee. As the knee moves towards the client's chin, both sides have to lengthen in proportion to keep the knee on a straight course. If one side is short, the knee will describe an arc toward that short side. In extension and hyperextension, – i.e. in standing –, the axis of the knee joint is turned towards the shorter side: the knees look medial with shortness on the medial side and create bow legs, because they also move out, and they turn to front lateral with shortness in the biceps and create knock knees, because they also move together in hyperextension. Knock knees and bow legs can have other causes like a variance in the position of the ossa coxae or of the angle of the femoral neck. These have nothing to do with structural internal or external rotation of the femora. In these cases the knees can still track a straight course in bending, which they cannot if knock knees or bow legs are of structural origin.
5. But not only the knees are affected. If the whole hamstring compartment of one leg is shorter than that of the other, it will contribute to pelvic torsion by pulling the ischial tuberosity down, in (medial), and forward. The iliac crest will show a higher curve on that side. In the supine position, as the knees move towards the client's chin, the ischial tuberosity of that shorter side will be lifted off and up earlier. Since this signifies clearly that the whole trunk will now go into a curl, shortening and compressing the «core», hamstring work should be done in a way which avoids such compression.

I position myself on the table in such a way that the client's foot rests against my chest, while she lies on her back. The other leg should be bent with the knee resting against the side of my body. This saves her the effort of keeping it from falling out, which would induce strain into the whole of the trunk. With clients with a posterior pelvic tilt or posterior or hypermobile lumbars, a shallow pillow should be placed under the lumbar spine for support. I now test the course the knee takes by moving the leg passively, bending the knee and bringing it towards the client's chin until the ischial tuberosity starts to come up. I now take hold of the client's knee with

Ill.3 Before and after hamstring technique.



one hand to ensure its straight course in a sagittal plane, making certain that the axes of the foot, ankle, knee, and hip joints stay parallel, and bend them passively by bringing my chest and with it the knee toward the client's head. With the other hand I lengthen the hamstrings, using knuckles or fist, taking hold of the tissue as it is stretched by my movements. The knee should never be taken up beyond the point where the ischial tuberosity starts to lift off the surface. The effect of lengthening can be measured by comparing how far up the knee goes now as opposed to before the intervention, using the lift-off of the tuberosity as the reference point.

The side of the compartment towards which the knee arcs must be lengthened until the arc disappears in passive as well as in active bending. This may not be possible completely since such arcs can also be the result of shortness of the psoas or the rotators. Therefore the procedure should be repeated frequently in subsequent sessions until the straight course of the knee is established.

In addition, I look and palpate with my free hand for places where the hamstrings don't move freely over the tissue below (vastus lateralis and adductor magnus) but are glued down. I free these thick septa between the compartments of the thigh by activating the two meeting at a septum in opposite ways by extension/adduction and flexion/abduction (vastus lateralis) or extension/abduction and flexion/adduction (adductors). It is important to keep these movements tiny and soft in order to avoid inducing strain into the overall structure. Afterwards, the straight course of the knee should be tested again and established anew if necessary.

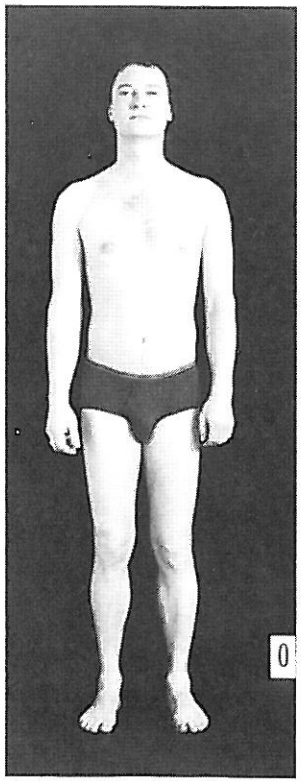
Wolf Wagner

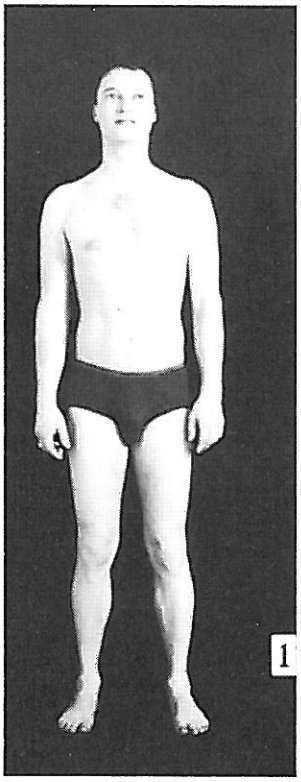
A Strain Position for the Fascia Lata

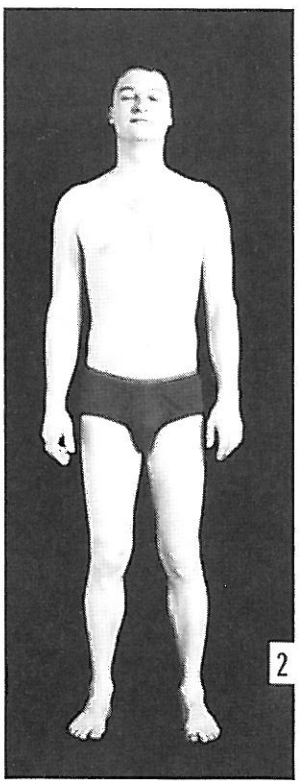
The fascia lata is approached and manipulated in many different fashions and with varying intention. It is sometimes extremely thick and hard from its function of containing the sideward thrust of the weight of the body and can «overachieve» this goal, jamming the core at the pelvis from both sides. When it is intended to open the center from the inside, preliminary work on the fascia lata to make room for this may be indicated.

With the client on the back, the knee of one leg is lifted up and the lower leg is taken out, the thigh rotating internally. The leg rests on the medial side of the foot which is pronated passively, forming the distal support point. The leg and the ipsilateral side of the pelvis are suspended, with the middle or upper back and the contralateral hip providing the other support point. The knee should not cross the midline, and the lower leg should be bent back more than 90°. The knee sinks as far as it goes towards the table. Bearing down lightly on its lateral side – which points up in space – lifts up the pelvis a little more and permits to check that the client is completely relaxed.

The anterior side of the fascia lata is stretched maximally from the iliac crest to the tibia. Long and narrow strings of tightness become prominent in it and allow for specific lengthening. I work from the lateral epicondyle up to the crest, freeing the fascia from the femur and the tensor from the trochanter when it is glued down there besides lengthening the strings. Because in this position the client is very vulnerable, I only use fingers or the vola manus. The other hand







when the musculature of the back is overdeveloped. It is then often drawn in by the two layers that branch off from there medially. The middle layer or aponeurosis lumbalis passes in front of the erectors, which it ensheathes together with the superficial layer, and in back of the quadratus to reach the processus costarii of the lumbar vertebrae. The deep layer goes in front of the quadratus to the bases of the processus costarii, enveloping the quadratus together with the middle layer. It continues laterally as the fascia transversalis, covering the m. transversus on the inside, all the way to the linea alba where it connects to the fascia transversalis of the other side. Superficially the fascia of the latissimus dorsi also branches off laterally.

In internals with a deep anterior lumbar curve the short lumbodorsal fascia

- maintains the lumbar lordosis as a string bends a bow,
- keeps the erectors medial and rounded, with their crowding the spine accentuating the lordosis further,
- pulls the back of the thorax down,
- and keeps up the iliac crest reinforcing the anterior pelvic tilt.

With the knee taken up, one hand, the working hand, goes under the back with varying intentions:

1. In the thoracic area the attachments to the ribs are freed by the fingers extending obliquely up and anterior.
2. The fascia of the erectors is spread and lengthened by going across it from the spinal groove to lateral.
3. The quadratus lumborum is affected by going under the erectors from lateral to medial in the direction of the middle and deep fascial layers or through the erectors directly.
4. The attachment to the iliac crest is lengthened by going deep and anterior above the crest.
5. The space between L4/L5 and iliac crest is widened.

The raised leg plays the more important role as it is manoeuvred to stretch and release the fascia. The contralateral leg is put up, and the knee should rather be allowed to sink in than fall out. The pelvis then lies back broadly on that side helping to keep the lower back open. With one hand I take up the knee of the ipsilateral leg towards the chest. My other hand is on the groin indicating that I don't want the tuberosities to rise up but the hip to stay back and distal. I then take the knee between my arm and the side of my chest. With the hand of this arm I hold down below the anterior superior iliac spine, replacing the other which goes under the back.

Only when the most superficial layer should be stretched is the pelvis allowed to come up following the leg. The controlling hand then keeps the hip well distal to assure that the back and the front of the spine remain long. But usually the tuberosities stay on the table. The raised knee is rather pushed back vertically toward the table than pulled up more to the chest. This squeezes the pelvis out in the distal direction. The controlling hand may go to the abdomen to assist the working hand, in which case axial pressure on the femur into the table and caudally supports the pelvis staying back and distal. The knee can be moved over to the other side which leads the hip to rotate out, aided by the controlling hand, tensing the fascia in the transverse direction.

The general guideline for the technique is that the front of the spine, which is approximately along the psoas, should not shorten or be compressed but only the tissue in the back should be stretched. Structural change is less effected by an active working hand than by placing it in the relaxed tissue with the intended direction and then tensing the tissue over it by moving the leg. Not all bodies are suitable for working with the fingers in this way. But it should not be forgotten that it is an eminent technical principle that the back of the hand is allowed to be pushed into the mattress maximally by the weight of the client and that extension of the fingers from there is primarily by pressing the back of the hand *more* into it.

The technique gives maximal and complete control over the client's body. It is experienced as comfortable rather than threatening and induces deep general relaxation. Any mistake is indicated promptly by muscle contraction. A well developed balance of the Rolfer's body is an essential prerequisite for success.

Hans Flury

pushes the knee slightly down, alternating with releasing it, so the body stays relaxed and the fascia moves a bit. This can be combined with a soft pull in the distal direction when the controlling hand reaches around the biceps tendon or those inserting as the pes anserinus.

Because of the extreme internal rotation and hyperextension at the hip and the relaxation of the body, all work must be considerate and with regard to the body suspended in balance. For the same reason, resolution of the position must be slow and careful by lifting up the knee slowly and holding it securely when the lower leg is taken forward. For internals, the position means taking the thigh far into the aberration, and the focus is naturally on the anterior part of the fascia. For externals, the position takes the thigh in the direction where it belongs but crosses over this point to its maximal range. The focus is then on the posterior side of the fascia which is a little less stretched especially proximally and so allows to go deeper behind the trochanter. It can be monitored by pulling and releasing the posterior margin of the fascia from behind or in front of the biceps tendon.

Due to the maximal passive tension, intention is solely on the most superficial layers. But some adjoining structures come also under consideration: the distal biceps, the lateral edge of the rectus, the vastus lateralis, and especially the septum intermusculare laterale. Except for very advanced clients the position must be considered as disorganizing, making it necessary to integrate the body some time afterwards.

Hans Flury

Lower Back Technique in the Supine Position

The lower back is usually organized with the client on the side or sitting bent forward. The prone position, lying on the stomach, requires care with internals and is more apt for externals with a marked posterior pelvic tilt. The supine position, where the client lies on his back, makes for comfortable working using his weight. The variation proposed here renders this a little more stringent. It is designed exclusively for internals.

The substrate is the fascia thoracolumbalis, the lumbodorsal fascia, the right and left sides of which meet at the dorsal processes of the thoracic and lumbar vertebrae, to which it is fastened down. It also continues down the back of the sacrum. From there it bridges over to the iliac crest which it follows out and up about halfway. There it departs from the crest in the cranial direction forming something like a free edge along the lateral margin of the erectors which it envelops. It narrows with them medially towards the spine as it traverses the thoracic area. There it is attached to the angles of the ribs. At its beginning at the crest the free edge forms the medial border of the trigonum lumbale, whose base is the crest, whose lateral border is the posterior margin of the external oblique, and at whose floor lies the internal oblique. More cranially it also forms the medial border of the spatium tendineum lumbale, which is bordered cranially by the 12th rib, laterally by the posterior margin of the internal oblique, and which is covered by the latissimus on the outside and the m. transversus on the inside.

The lateral margin only appears to be a free edge, especially

Ill.4 Before and after fascia lata (1) and after lower back technique (2).