A RELATIONSHIP BETWEEN BODYWEIGHT AND LOW-BACK DYSBALANCE: A PROSPECTIVE STUDY

In my osteopathic practice I have frequently been confronted with the concurrence of overweight and certain abnormalities in vertebrae and the pelvis. The following may serve to give an impression of the categories of overweight in question.

Of the experimental groups that form the subject of this paper (Dutch citizens, age between 40 and 60 years) 87% had an above average weight. 40% weighed over 10 kilos and 30% over 20 kilos more than the average weight applicable to their height.
To enable a statistical study to be made of the relationship between overweight and vertebral abnormalities, data from 150 patients were systematically classified. The need for this was prompted by various considerations, including the fact that apart from Bray (1987) and Peterson (1988) I could find no relevant literature on this subject.
The age-sex distribution and body mass index (BMI) of the aforesaid patients, all of whom presented with back complaints, are shown in table I (BMI is weight : height squared).

Statistical analysis showed that with the BMI as the criterion, women and men and age categories may be regarded as a single experimental group: their mean BMI does not differ significantly. The result of the initial orientation (consolidation of the many sub-groups) is shown in table II. This shows the mean BMI and the corresponding standard deviations for the three experimental groups.

As I wanted to be sure that no other significant factors (thyroid gland!) would be present in the presumed relationship between vertebral/pelvic positions, on the one hand, and overweight on the other hand, I also collected other data. At my request the patients allowed a number of blood values to be measured after fasting. They themselves took their temperature in the morning (rectal before rising) and their temperature in the evening (immediately after retiring). These data are shown in table III.
As all patients did not comply with my request, the numbers in table 1 and table II do not correspond to those in table III. The differences in number were found to have no statistical influence on the differences between the groups.

Study control group
According to the data on their condition, it was found that the 150 test subjects drawn in chronological order from my patient files could be classified in four groups.

Group I: scoliotic position of LS and L5
Both vertebrae are connected to the pelvis by ligaments. The scoliotic position entails a displacement of the vertebral body from the median plane, either towards the left or towards the right. This position was determined by palpation and functional examination.

Group II: L4/L5 plus a lateral deviation of the sacrum (S)

Group III: Lateral curvature of the sacrum (S)
A lateral curvature of the sacrum is defined as a situation in which there is a lateral deviation of the sacrum between the two ossae ilia (a phenomenon which is familiar to radiologists).

Group IV: the control group
These patients had presented with diverse complaints and were found after subsequent examination to have none of the above-mentioned abnormalities. They could consequently qualify as a control group.

Results
A comparison of the BMI of the various experimental groups produces the following results:

A. The mean BMI of the three experimental groups is higher than that of the control group (P 0.001). A statistically significant correlation between abnormalities of L5 and L4/S, on the one hand, and overweight on the other hand, is thus demonstrated.
B. The concurrence of two abnormalities, namely those of the vertebrae L4 and L5 plus a lateral deviation of the sacrum (experimental group II), coincides with the highest BMI of the three experimental groups. The difference between groups II and IV is likewise statistically significant.

In connection with my investigation of the blood values the following was established:

- the T4 values were well within the norm;
- the triglyceride values are above normal;
- the cholesterol values are above average for the Netherlands and certainly higher than the desired values (5.5);
- the HDL values are good; the LDL values are too high.

Temperature inversion
This refers to the phenomenon of a lower evening temperature compared with the morning temperature. This inversion could be explained as follows. When walking, the eccentric loading of the sacrum and the lateral curvature of the sacrum itself generate severe friction in the sacrum and its environment, where the sacral portion of the parasympathetic nervous system is also situated. This may lead to stimulation of the parasympathetic nervous system. An excess of acetylcholine inhibits the sympathetic nervous system, which in turn regulates the microfibrillations of the muscles that control our temperature. A reduction in microfibrillations leads to a fall in temperature. The majority of the calories we consume are used to maintain our temperature. A reduced calorie requirement with a normal diet will lead to an accumulation of adipose tissue.
When a lot of walking is done, this leads to more stimulation of the parasympathetic nervous

system and lowers the temperature. The outcomes of the temperature investigation show no inversion if we keep to the comparison of mean temperatures. However, if we compare how many patients show inversion in the experimental groups and the control group, then a quite different picture emerges.
Experimental groups I, II and III: altogether a total of 49 inversions. Control group IV: no inversion. The explanation for the difference between the outcomes (mean figures versus numbers) is as follows: the experimental groups show a number of peaks in terms of weights and temperatures. These primarily influence the mean temperature and the range. These extremes do not occur in the control group.

Statistical analysis of my data on bodyweight, on the one hand, and abnormal positions of L4, L5 and S, on the other hand, does not provide an answer to the question concerning a causal connection. It is not inconceivable that overweight leads to abnormalities in the vertebral column and the pelvis. A longitudinal study might be able to verify this theory. The experience of osteopathic medicine is different.
I find ample indications for a causal connection in the anamneses of my patients. They report an accident with complaints as a result. Upon further investigation it is found that some months after the accident their weight has increased, without any change in their diet or lifestyle. Furthermore, drastic treatments to reduce their overweight had no permanent result.

Assisted delivery
A striking aspect of these anamneses concerns the reports of women who gained weight after an assisted delivery with expression. This is consistent with the experiences of my mother and myself: both of us started having weight problems for the first time after an assisted delivery with expression; while in my case, after 30 years of dieting and slimming, a few months after treatment to correct a back problem I was able to resume a normal diet without adverse effects. In cases like these you will always find a lateral deviation of the sacrum.

Unfortunately our practice is not really suitable for a large-scale follow-up of curative results. Four years have passed since we conducted this study. Since then we have seen 4000 new patients.

The results of the study have been confirmed in the intervening period mentioned above: nearly all patients with overweight had abnormalities in the above sense. The couple of patients in whom this was not the case confirmed chronic overeating as the cause. In these patients the fat was distributed over the whole of the body, while in the low-back patients the thighs, abdomen and hips were the principal areas of obesity.

Summary
In a prospective study a comparison is made between A) a group of patients without a specified low-back dysbalance and B) three groups of patients with such a specified dysbalance. The groups are compared on temperature, body mass index (BMI), cholesterol, triglycerides and T4. Significant differences were found.

References

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Table I. BMI by sex and age of three experimental groups and a control group.

Groups				Age					Mean BMI	Mean BMI
			40	40-49	50-59	60-69	70-79	79	F/M	F + M
Group I	F	BMI	-	26.9	28.0	-	28.3	-	27.7	
		n	-	11	17	-	2	-	30	26.8
L4,L5	M	BMI	-	26.7	27.9	23.2	-	-	25.9	n=47
		n	-	11	4	2	-	-	17	
Group II	F	BMI	32.0	29.5	34.1	27.9	28.8	-	30.5T	
L4,L5		n	4	8	5	1	2	-	20	30.2
+	M	BMI	31.5	30.9	25.8	30.7	-	-	29.7	n=32
S		n	3	5	1	3	-	-	12	
Group III	F	BMI	-	-	-	25.8	-	-	25.8	
		n	-	-	-	1	-	-	1	27.0
S	M	BMI	30.8	25.7	-	-	-	-	29.5	n=5
		n	3	3	-	-	-	-	4	
Group IV	F	BMI	-	20.9	21.2	22.0	20.3	-	21.1	
		n	-	22	6	9	2	-	39	21.44
no abnor-	M	BMI	-	23.3	21.8	20.9	23.2	20.1	21.8	n=66
malities		n	-	12	6	2	6	1	27	

Table II. Mean BMI of the 4 groups.

Groups	BMI Mean	Std. dev.	N
Group I L4,L5	2.2	3.0	48
Group II S+L4,L5	30.8	5.0	30
Group III S	28.8	4.6	5
Group IV no abnor-malities	21.8	4.9	50

Table III. Some blood values of the 4 experimental groups.

Groups		BMI	Temp. (M)	Temp (E)	T4	Chol.	Trig.	LDL	HDL	n	N
Group I	F	27.6	36.6	36.8	98.0	6.2	1.9	3.3	1.4	31	48
	M	26.6	36.5	36.6	97.7	6.2	1.9	5.4	1.2	17	
Group II	F	31.4	36.6	36.8	109.8	6.1	2.0	-	1.2	21	33
	M	29.7	36.9	37.0	91.6	6.3	1.6	4.7	1.7	11	
Group III	F	25.8	36.2	36.7	-	-	-	-	-	1	5
	M	29.5	36.6	36.8	-	-	-	-	-	4	
Mean Group I,II,III		28	36.5	36.8		6.5	1.8	4.5	1.7		85

Mean Group IV	21.4	36.7	37							50
Mean for the Netherlands					5.8					
Norm.					5.5	2	2.3	0.9		

Temp. (M) or (E) = morning and evening temperature, respectively
Trig. = triglycerides
- = no or insufficient observations