

RUPTURE OF THE PUBIC SYMPHYSIS: DIAGNOSIS, TREATMENT AND CLINICAL OUTCOME

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Lesions of the pubic symphysis are common in patients who have sustained blunt trauma, such as traffic accidents or falls from a large height. Associated injuries of the head, chest, abdomen, nerves and especially of the urogenital tract are often present and predict the treatment strategy as well as the outcome of therapy. The standard diagnostic tool in order to better judge the stability of the pelvic ring is the anteroposterior (AP) radiograph of the pelvis. Inlet and outlet radiographs can be particularly helpful in these cases.¹⁻³ Computer tomography is excellent in detecting accompanying ligamentous lesions of the sacroiliac joint. In addition, the use of ultrasound examination in some cases shows good results, but is not very common.⁴

Since the early 1940s, conservative treatment of symphyseal ruptures, with extension and compression of the pelvis as advocated by Böhler,⁵ was the treatment of choice, but it had the disadvantage of leaving behind deformities of the pelvic girdle with or without luxations, as well as chondroligamentous instabilities.

In the last 15 years, stabilization with internal and external osteosynthesis, and in recent times banding with PDS cord, have been described as very successful.^{6,7} Our method of therapy, with reconstruction-plate osteosynthesis in combination with tension band wiring in isolated lesions of the pubic symphysis, has proved very successful.

Patients and Methods

From January 1988 to December 1997, a total of 22 osteosynthesis procedures of the symphysis only (reconstruction-plate osteosynthesis in combination with tension band wiring, using the "Pfannenstiel" approach) were performed. Any isolated separation of the symphysis was treated operatively, regardless of the degree of separation. All patients with translatory instability caused by lesions of the dorsal hemipelvis, with open reduction of



FIGURE 1A. Pubic symphysis disruption.



FIGURE 1B. 3-D CT scan.

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acetabular fracture, as well as polytrauma patients who died during the first period of hospitalization, were excluded. Details of the patients are shown in Table 1. A follow-up of the cases was done after a minimum of one year (mean 4 years 1 month, range 1-9 years) after surgery.



FIGURE 1C. Reconstruction plate osteosynthesis in combination with tension-band wiring.

Clinical evaluation was done by an orthopedic surgeon, and a special note was made of pain levels and patient comfort, and the results scored according to the classification of an international pelvis study group (Arbeitsgruppe Becken der DGU and AO International). Clinically, 4 points at maximum (free function, i.e., no pain, no neurological deficit) were reachable, radiologically 3 points (exact reconstruction, no diastasis).⁸

Radiographs at the visit included an anteroposterior view of the pelvis, and an inlet and outlet view with the tube set at 45° craniocaudal or caudocranial to the center of the pelvis. Measurement of the symphysis migration was done by x-ray and ultrasound.

Results

The long-term results from one to nine years after surgery were studied. Two groups of radiological findings—before and after the metals were removed—were used in the analysis, but these showed identical results in terms of clinical findings and social integration.

Early postoperative complications included septic metal removal after three months (three patients) and one deep vein thrombosis. Nine of the 22 patients operated on for ruptures of the symphysis had pain and inconclusive clinical results, and eight of them had accompanying lesions, especially of the extremities. Thirteen patients who underwent operation were free of pain and had excellent outcome. X-rays after weight-bearing confirmed all these results.

Focusing on radiological findings, we observed that eight patients with exact reconstruction of the pelvic ring complained of pain, but one patient with a dislocation of the pelvic girdle had no pain but excellent function and good walking ability after treatment. The measurements of



FIGURE 1D. Final outcome.

TABLE 1. Details of 22 patients with pubic symphysis disruption, 1988-1997.

Sex/age at injury (yr)	Cause of injury	Extrapelvic lesions	Time from injury to osteosynthesis (days)*	Metal removal (mo)
F/26	Motorcycle	Fx upper limb	Same day	3
M/21	Motorcycle	Fx lower limb	1	—
M/27	Motorcycle	Fx lower limb	26	—
M/64	Fall from height	Fx upper limb	6	42
M/49	Pinching	None	Same day	24
M/32	Pedestrian	Amputation	Same day	34
M/27	Car accident	Chest/abdomen	Same day	20
M/52	Pinching	None	1	—
M/57	Pinching	Amputation	Same day	—
M/46	Motorcycle	Urogenital	Same day	3
F/18	Pedestrian	None	13	—
F/19	Pedestrian	Fx lower limb/urogenital	Same day	—
M/32	Pinching	Urogenital	8	4
M/35	Motorcycle	Urogenital	1	—
M/55	Pinching	Urogenital	Same day	—
M/23	Motorcycle	Fx upper limb	9	12
F/53	Motorcycle	Fx lower limb	21	—
M/35	Pinching	Fx upper limb	11	—
M/37	Fall from height	None	8	—
M/56	Fall from height	None	1	—
M/54	Skiing	Fx lower limb	12	12
M/48	Fall from height	None	1	3

*Only plate osteosynthesis in combination with tension band wiring; Fx=fracture

dehiscence, as well as of vertical dislocation of the pubic symphysis taken by ultrasound, were identical to the x-rays.

Discussion

Any interruption of the pelvic ring caused by fracture or rupture of synchondrosis leads to disturbance of its construction and instability. The management of these lesions has changed over the years, from a more conservative concept⁵ to surgical treatment with screw and plate osteosynthesis for the whole pelvic ring.^{6,7,9} The operative strategy is determined by the accompanying lesion of the dorsal structures. After conservative treatment with extension and compression of the pelvis, remaining deformations of the pelvic girdle with or without luxations or chondroligament instabilities have been very common.¹⁰ After exact reconstruction of the symphysis and the pelvis, most of the patients were free of pain and had excellent results.

Biomechanic studies show plate osteosynthesis as one of the most stable procedures of isolated symphyseal lesions. A combination with tension-band wiring can further improve these results. Our method of early operative treatment with reconstruction plate, combined with tension-band wiring and weight-bearing starting four weeks after stabilization, led to satisfactory clinical outcome and anatomical reconstruction of the pelvic ring, even after metal removal in over two-thirds of our cases, but there was a high influence of accompanying extrapelvic lesions on the outcome.

Because of these findings, we recommend plate osteosynthesis combined with tension-band wiring in

isolated lesions of the pubic symphysis, although anatomical reconstruction does not always correlate with the clinical outcome in some patients, a phenomenon which has also been observed by other authors,^{11,12} and will no doubt be the subject of further examinations.

References

1. Edeiken-Monroe B, Browner BD, Jackson H. The role of standard roentgenograms in the evaluation of instability of pelvic ring disruption. *Clin Orthop* 1989;240:63-76.
2. Young JW, Burgess AR, Brumback RJ, Poka A. Pelvic fractures: value of plain radiography in early assessment and management. *Radiology* 1986;160:445-51.
3. Pennal GF, Tile M, Waddell JP, Garside H. Pelvic disruption: assessment and classification. *Clin Orthop* 1980;151:12-21.
4. Weber K, Mahlfeld A, Sekulla C, Otto W. The benefit of ultrasound in lesions of the pubic symphysis. *Europ J Ultrasound* 1997;6:111-6.
5. Böhler L. Die Technik der Knochenbruchbehandlung im Frieden und im Kriege. Wien: Maudrich, 1944.
6. Tile M. Pelvic ring fractures: should they be fixed? *J Bone Joint Surg* 1988;70:1-12.
7. Marra JM, Saucedo T. Internal fixation of pelvic ring fractures. *Clin Orthop* 1989;242:83-97.
8. Pohlemann T, Gänsslen A, Hartung S. Arbeitsgruppe Becken: Ergebnisse einer multizentrischen Studie. New York: Springer, 1997.
9. Rubash H, Brown T, Nelson D, Mears D. Comparative mechanical performance of some new devices for fixation of unstable pelvic ring fractures. *Med Biol Eng Comput* 1983;21:657-63.
10. Henderson R. The long-term result of nonoperatively treated major pelvic disruption. *J Orthop Trauma* 1989;3:41-7.
11. Kothe H, Keller W, Heindel W, Rehm E. Erfahrungen mit der operativen Behandlung von Symphyse rupturen. *Zentralbl Chir* 1994;119:37-43.
12. Pohlemann T, Gänsslen A, Schellwald O, Culemann U, Tscherner H. Outcome after pelvic ring injuries. *Injury* 1996;27:31-8.