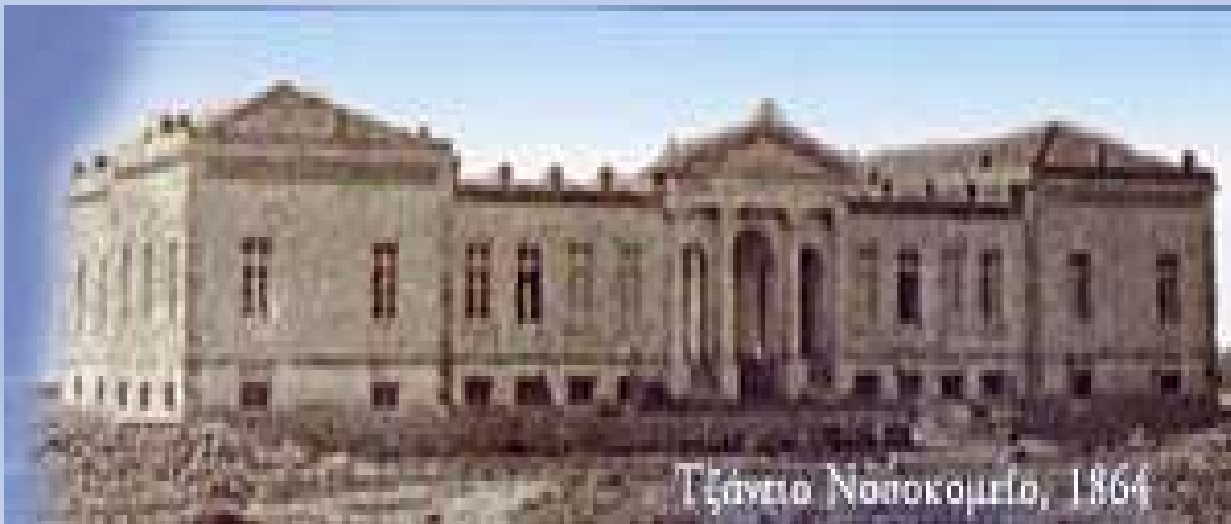


Χειρουργική αντιμετώπιση συνδυασμένης κάκωσης πυελικού δακτυλίου, κατάγματος άνω ηβικού κλάδου, με κάταγμα ιερού ή εξάρθημα της ιερολαγονίου, σε συνδυασμό με ή χωρίς διάσταση ηβικής σύμφυσης με την χρήση modified-Stoppa προσπέλασης.

Φ. Νικολόπουλος¹, Δ. Σαμαράς², Λ. Κολλίντζας², Ν. Τζώρας³, Γ. Κυρχανίδης⁴, Παπαχρήστου Ιωάννης³, Θεόδωρος Γρίβας¹

1. Διευθυντής, MD, PhD, 2. Επιμελητής Α, MD, 3. Επιμελητής Β, MD, 4. Ειδικευόμενος Ορθοπαιδικής κλινικής.



Εισαγωγή/Σκοπός:

Ανάμεσα στις σοβαρές πυελικές κακώσεις είναι η διάσταση της ηβικής σύμφυσης που συνδυάζεται με διάσταση ιερολαγονίου διάρθρωσης και/ή κάταγμα ιερού αλλά και με κάταγμα συνήθως συντριπτικό του άνω ηβικού κλάδου σύστοιχα, ετερόπλευρα ή αμφοτερόπλευρα. Αυτός ο συνδυασμός μπορεί να καταταχθεί σύμφωνα με την κατάταξη Young and Burgess ως LCIII (Lateral Compression) or CM type (Combined Mechanism) και επίσης ως 61-B3.1 61-B3.2 κατά AO/OTA. Η δυσκολία αντιμετώπισης αυτών των καταγμάτων έγκειται στο πώς θα αναταχθεί η ηβική σύμφυση και το ιερό ή η ιερολαγόνια διάρθρωση με σταθερό εμβιομηχανικά τρόπο αφού η συνύπαρξή κατάγματος στον ένα ή και στους δύο κλάδους του ηβικού, κάτι τέτοιο το εμποδίζει περιορίζοντας τους βαθμούς ελευθερίας χειρισμών. Σκοπός της εργασίας είναι να αναδείξει τον τρόπο αντιμετώπισης αυτών των συνδυασμένων κακώσεων καθώς επίσης και τις δυσκολίες που προκύπτουν μέσα από πραγματικά περιστατικά που χειρουργήθηκαν στην ορθοπαιδική κλινική μας.

Υλικό & Μέθοδος: Επιλέγουμε να παρουσιάσουμε 3 διαφορετικά περιστατικά με διαφορετικό βαθμό δυσκολίας με τις προαναφερόμενες συνυπάρχουσες κακώσεις και συνδυασμούς τους.



Fig 1. Case 1. Both ischial tuberosities are broken. Notice the malrotation of the left hemipelvis & the SI joint both widened, especially in the left side. Also notice the upper pubic rami fractures in both sides, suggesting the complete instability of the pelvis.



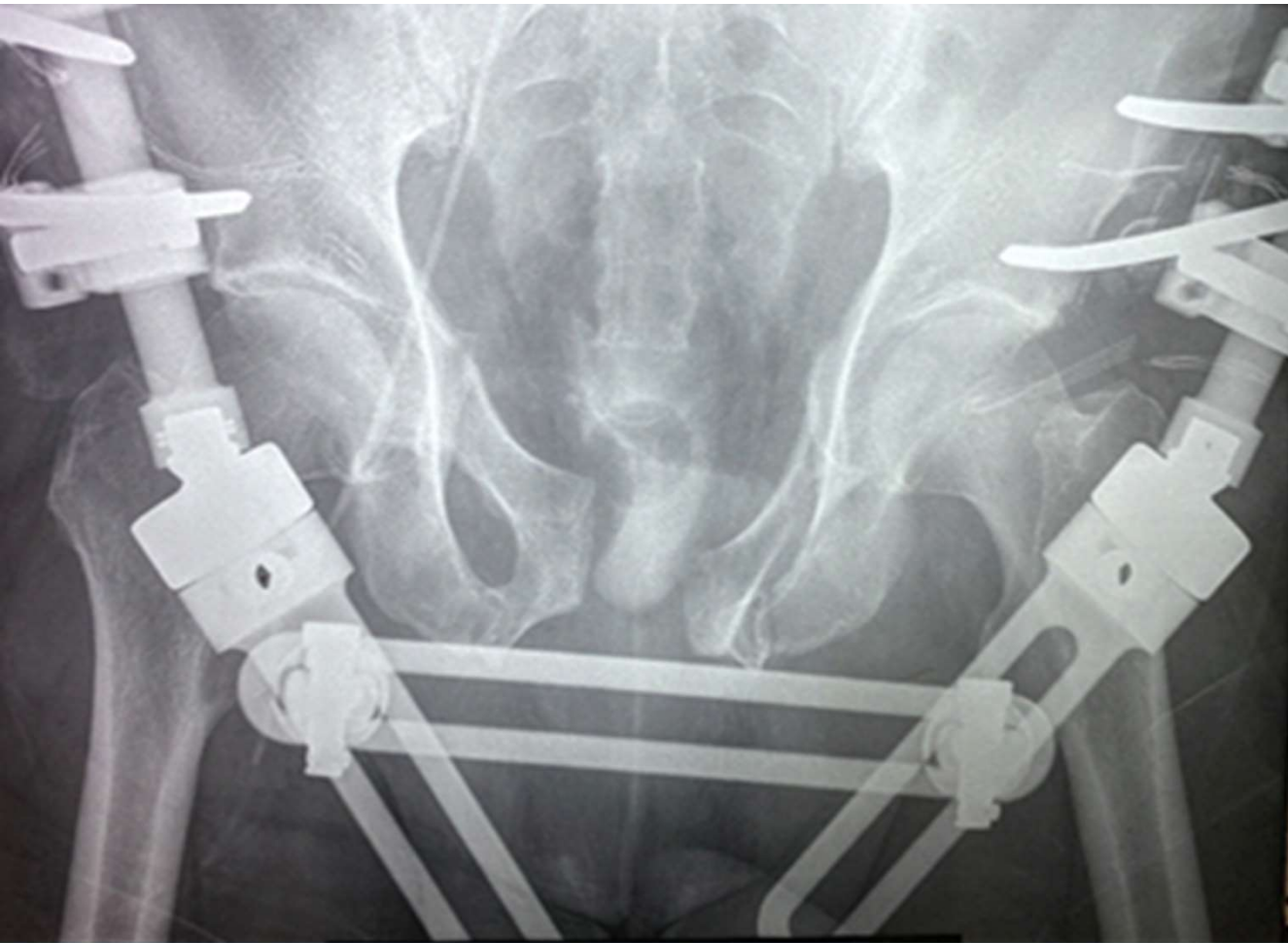


Fig 2. Case 1. Initially an ex-fix was put to stabilize and reduce the pubic symphysis & the left iliac wing. It was not possible to perform the reduction because the left wing was hitched on (hinged & blocked) from the sacrum posteriorly. Notice that the half pin was bended due to forceful manipulation in order to close the pelvis.

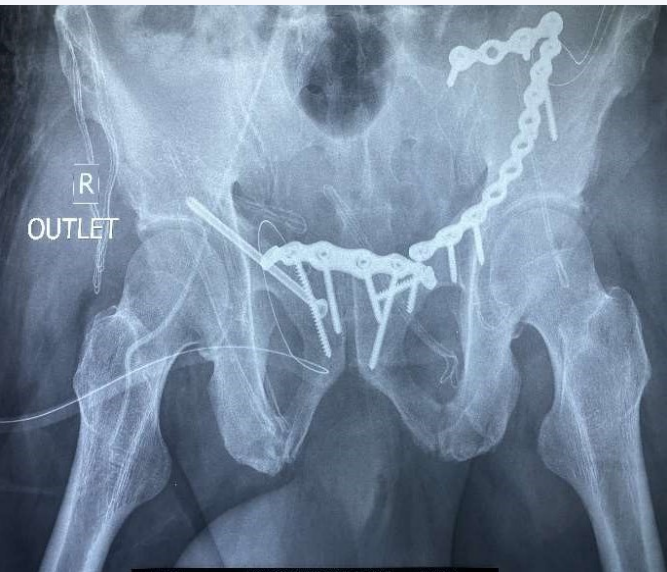


Fig 3. Case 1. In the outlet view (above) the retrograde screw right & the plate left were placed firstly.

The sequence of the reduction and fixation was the following: First, we stabilized the two rami fractures. This accomplished with a plate in the left side and a retrograde screwing to the right pubic rami via Stoppa (Anterior Intrapelvic Approach). Then, after redacting and closing the pubic symphysis we put a plate for fixing the symphysis using the same approach and lastly, we closed and fixed the left SIJ widening Fig 4 using a plate also, anteriorly via the first window of the ilioinguinal approach

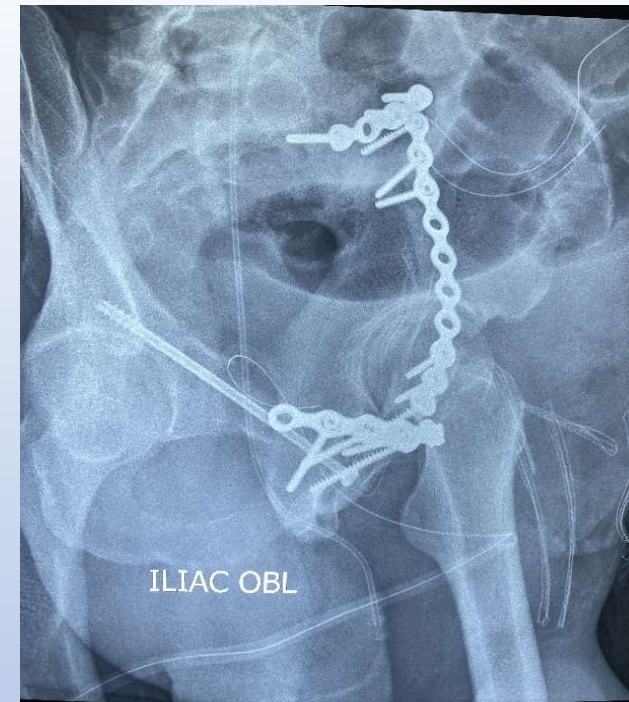


Fig 4. Case 1. Notice the perfect reduction of the pubic symphysis and SIJ fixation in face projection. In the iliac oblique view projection, we confirmed the final position of the retrograde screw.



Fig 5. Case 2. Open book injury in combination with and SIJ disruption right side and rami fracture Nakatani II in left side.

Left: Anteroposterior x-ray, there was also a bladder rupture as the contrast agent diffuses in all the true pelvis.

Middle: CT/scan-notice the SIJ disruption in the right side.

Right: 3D/reconstruction, notice the upper pubic ramus fracture on the left and the SIJ disruption in the right side.



Fig 6. Case 2. Right: Four plate were used. Firstly, the right pubic rami stabilized with a long plate, secondly the pubic symphysis secured with a strong special plate (Stryker) and finally the two plates were set in the SIJ. The reduction-closing of the SIJ, using forceps presupposes the stabilization of the symphysis.

Left: A postoperatively CT/scan confirms the good position of the 6mm screw which used through the plate since passed beside the right sacral foramen leaving it free.



Fig 7. Case 2. Left side: 6 weeks an anteroposterior x-ray reveals stable osteosynthesis. Right side: The approach was used is the modified Stoppa in conjunction with the upper two windows of the ilioinguinal approach. The vertical limb of the Stoppa approach to the umbilicus through linea alba helps us to reveal the upper pubic rami until the iliac to secure the osteosynthesis with the plate.

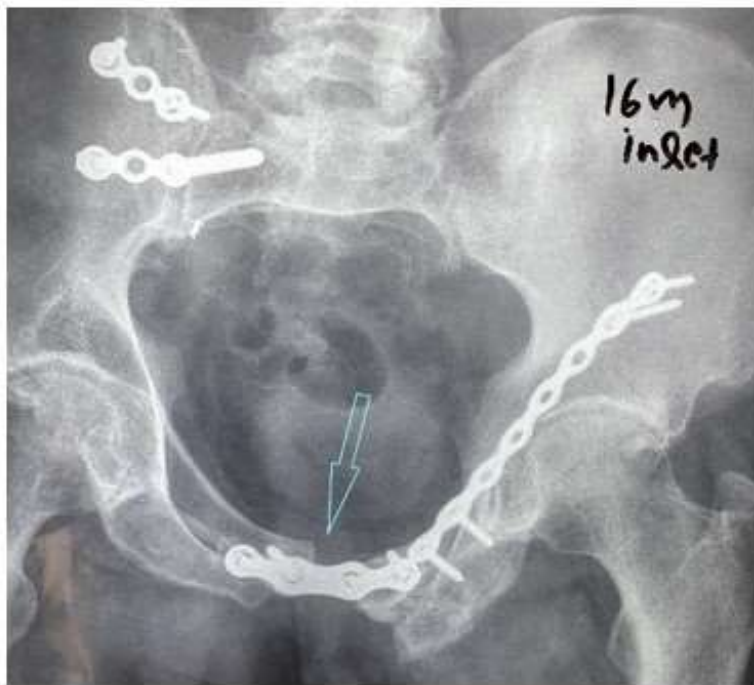


Fig 8. Case 2. Left side: The x-ray 16m postoperatively depicts the residual malposition of the pubic symphysis due to the difficulty we had to manipulate and reduct it.

Right side: Even though the existence the malposition of the symphysis the patient is incredibly happy because walks and sits without pain or other disturbances.

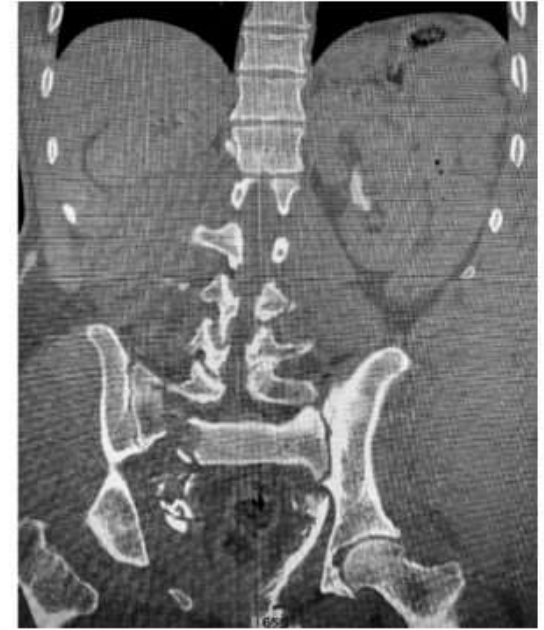
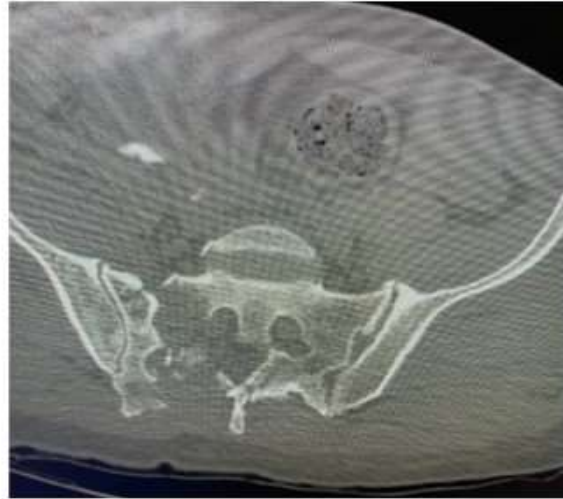


Fig 9. Case 3. Left side: The x-ray depicts the open pubic symphysis and difference in height of the hemipelvis. Something happens in the sacrum.

Middle: Sagittal CT/scan reveals a comminuted fracture of the sacrum without SI disruption. The right sacrum is displaced due to the fracture. The patient was unstable. There was not neurological deficit because the sacral fracture is Dennis II, so the nerve roots were not impaired.

Right side: Coronal CT/scan view, notice the comminuted right side of the sacrum.

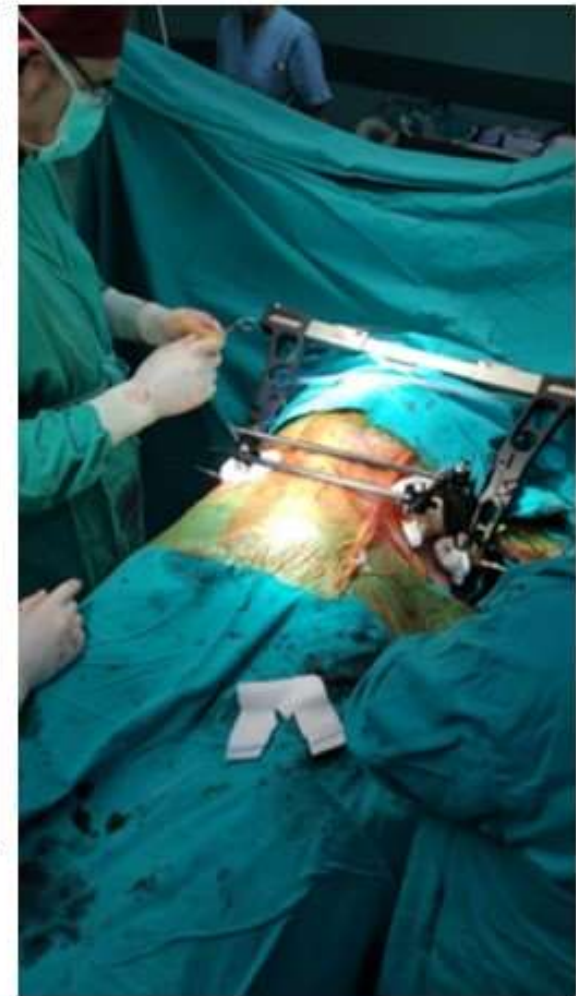
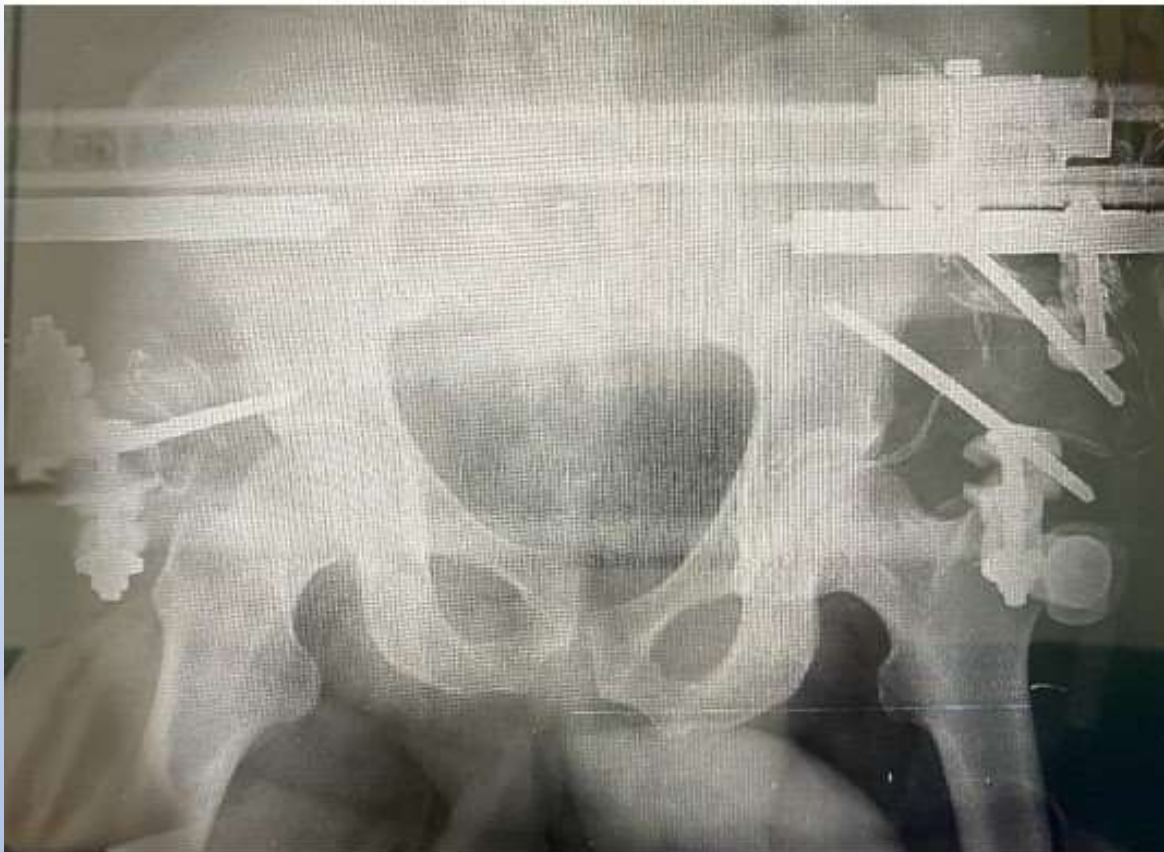


Fig 10. Case 3. Left side: Postoperatively x-ray with the C-clamp & the External fixator in positioning.
Right side: Intraoperatively, the two external fixators in place.



Fig 11. Case 3. Left: intraoperatively the c-arm view, plates in good positioning. Middle: the outlet views postop x-ray. Right: Intraoperatively photo depicts how the plate is placed to the posterior sacrum.

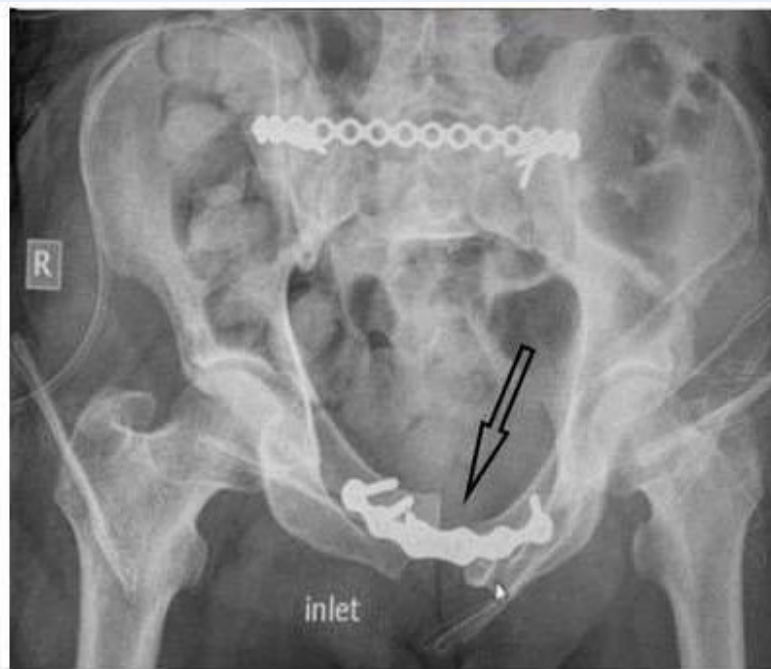
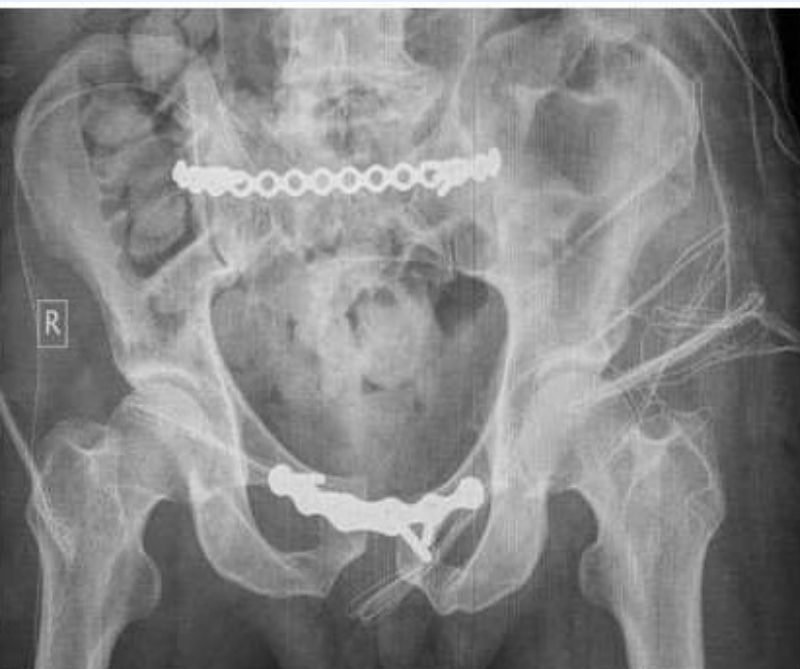


Fig 12. Case 3. Left: Postop x-ray, anteroposterior view demonstrates inadequate reduction of the right hemipelvis.

Middle: the inlet view depicts inconsistency of the pubic symphysis (arrow).

Right: Six weeks postop the patient walks satisfactory free of pain using walker.

Conclusions:

It's a big challenge to cope with such complicated fractures. The secrets which we can give are as follows: Operate as soon as possible, fix first the anterior column in one or in both sides using the most familiar approach but especially when you have low or middle anterior column fractures use Anterior Intrapelvic Approach, then close and fix as stable as you can the pubic symphysis, and finale use the first window of the ilioinguinal approach to fix the Sacroiliac joint or put cannulated transcutaneous sacroiliac screwing.

Bibliography

- 1) AOTRAUMA, “Fractures of the Pelvis and Acetabulum, Principles and Methods of Management-Fourth Edition” Marvin Tile, David L Helfet, et al. Vol 1-Pelvis, 2015, Table 1.3-3, p.53
- 1) “Rockwood and Greens’s Fractures in Adults” Paul Tornetta et al, Ninth Edition,2020 Wolters Kluwer, Vol 2, Section three, “Axial Skeleton, Pelvis and Acetabulum” Table: Young and Burgess Classification, P.1976
- 1) AOTRAUMA, “Fractures of the Pelvis and Acetabulum, Principles and Methods of Management-Fourth Edition” Marvin Tile, David L Helfet, et al. Vol 1-Pelvis, 2015, Table 1.3-1, p.49
- 1) AOTRAUMA, “Fractures of the Pelvis and Acetabulum, Principles and Methods of Management-Fourth Edition” Marvin Tile, David L Helfet, et al. Vol 1-Pelvis, 2015, Fig 1.3-18 “Nakatani classification of superior pubic ramus fractures”
- 5) Schmal H, Markmiller M, Mehlhorn AT, Sudkamp NP. Epidemiology and outcome of complex pelvic injury. **Acta Orthop Belg** 2005;71(1):41–47. [Medline](#), [Google Scholar](#)
- 6) Kellam JF, Mayo KA. Pelvic ring disruption. In: **Skeletal trauma**. 3rd ed. Philadelphia, Pa: Saunders; 1052–1108. [Google Scholar](#)
- 7) Durkin A, Sagi HC, Durham R, Flint L. Contemporary management of pelvic fractures. **Am J Surg** 2006;192(2):211–223. [Crossref](#), [Medline](#), [Google Scholar](#)
- 8) Kurylo JC, Tornetta P 3rd. Initial management and classification of pelvic fractures. **Instr Course Lect** 2012;61:3–18.