

**Does Removal of the Symphyseal Cartilage in Symphyseal Dislocations Have Any Effect on Final Alignment and Hardware Failure?**

Paul Tornetta III, MD<sup>1</sup>; Kyle Lybrand, MD<sup>1</sup>; John Kurylo, MD<sup>1</sup>; Jordan Gross, BS<sup>1</sup>; David Templeman, MD<sup>2</sup>;

<sup>1</sup>Boston University Medical Center, Boston, Massachusetts, USA;

<sup>2</sup>Hennepin County Medical Center, Minneapolis, Minnesota, USA

**Purpose:** Multiple factors have been correlated with failure of symphyseal reductions including the use of short plates and the quality of the reduction. The symphyseal cartilage is typically left in place and compression across it is utilized to gain stability. We hypothesized that removal of the cartilage would allow for greater friction with compression creating a more stable construct. The purpose of this study is to compare the results of symphyseal fixation with and without symphyseal cartilage excision.

**Methods:** We retrospectively evaluated the records and all radiographs of patients at two trauma centers who had APC (anterior posterior compression)-2 or APC-3 injuries with symphyseal dislocation. Bilateral injuries, those with associated acetabular injuries, and those lost to follow-up were excluded. Operative indications were the same for both centers with iliosacral screws used only for type 3 injuries with complete widening and displacement of the posterior ring. Both centers used 6-hole plates through a rectus-sparing approach. One center routinely removed the symphyseal cartilage and the other did not. We compared the postoperative and final separation at the superior and middle of the symphysis, and the incidence of hardware loosening and plate breakage between patients who had their cartilage excised and those in whom it was retained. Multiple screw loosening ± breakage was considered as one event. Plate breakage with screw loosening was considered one event in the combined calculation.

**Results:** We reviewed 95 patients (88 male, 7 female) aged 19-76 years (mean 48), with ISS 4-51 (mean 15.6) who had 65 APC-2 and 30 APC-3 symphyseal injuries. Motor vehicle and pedestrian struck accounted for 67% of injuries. There was no difference in the demographics between the groups, although the initial displacement in those not “sheeted” was slightly greater in the retention group (*P* < 0.05). The symphyseal cartilage was removed in 50 patients and retained in 45. There was no difference in the reduction of type 2 and 3 injuries so the results are reported together. As expected, the symphyseal space after cartilage excision was less than if retained. This difference was maintained through union and was true for the AP and outlet views. The measurements are shown for the AP radiographs in Table 1. The incidence of screw loosening, plate breakage, and combined hardware problems was statistically lower in those in whom the cartilage was excised (Table 2).

**Table 1: AP Radiographic Reduction and Final Position at Union (in mm)**

Location	Initial Postop Reduction			Position at Union		
	Excision	Retention	<i>P</i> Value	Excision	Retention	<i>P</i> Value
Superior	2.0 ± 1.0	6.1 ± 2.4	<0.0001	3.6 ± 2.6	8.3 ± 4.3	<0.0001
Middle	2.5 ± 1.2	6.1 ± 2.8	<0.0001	4.1 ± 2.9	8.2 ± 4.0	<0.0001

• The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an “off label” use). For full information, refer to page 600.

**Table 2. Hardware Complications**

	Excision (50)	Retention (45)	<i>P</i> Value
Screw loosening	9 (18%)	18 (40%)	0.04
Plate breakage	2 (4%)	8 (18%)	0.02
Combined	11 (22%)	22 (49%)	0.009

**Conclusion:** Hardware failure is common after symphyseal reconstruction. While multiple factors leading to possible failure and displacement have been examined, no data exist regarding excision of the symphyseal cartilage to gain better friction across the symphysis. We sought to evaluate the effect of symphyseal cartilage excision on final alignment and hardware complications. We found that excision led to closer apposition of the symphyseal bodies postoperatively and at final follow-up and that this correlated with substantially lower rates of loosening and plate breakage. Surgeons may elect to use this technique to avoid hardware failure and maintain closer apposition of the symphyseal bodies.