

Angles of rafting screws AxSOS 3® Titanium PLT Plate

Background

Screw trajectories in proximal tibia fracture treatment with locked plates strive for parallel rafting screws to the joint line. For the AxSOS 3® Titanium Proximal Lateral Tibia Plate, a SOMA analysis was conducted to investigate the orientation of these screw trajectories from a statistical standpoint.

Material

- AxSOS 3® Titanium Proximal Lateral Tibia plates: 2-hole-plate (REF 627302), 8-hole-plate (REF 627308)
- Stryker Implant Fitting Tool (SIFT) for automated algorithmic fitting of plates on individual bone models (see Figure 1 and Figure 2)
- Stryker Anatomy Analysis Tool (SAAT) for measurement of the screw trajectory angles
- 833 left tibia bone models (age: 18 to 97 years)

Method

- Based on the algorithmic fitting for each patient, the three most proximal screw trajectories were imported into SAAT.
- The tibia plateau was defined in SAAT using 17 points placed on the rim of the plateau.
- Measurement of the screw-axis-angles in SAAT relative to the tibia plateau plane (angle measured negative, when screw axes diverge from tibial- plateau towards the far cortex see Figure 2).



Figure 1: SIFT fitting picture from lateral

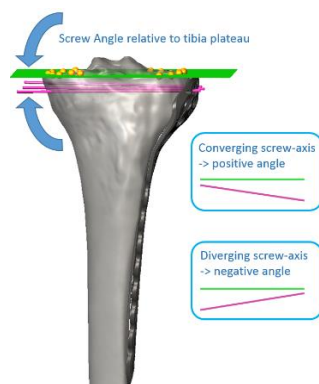


Figure 2: SIFT fitting picture from anterior

Results

Table 1: 2-hole plate results [1]

Description	Mean	Std Dev	Min	Max	Median
Anterior-rafting-screw [°]	-0.7	2.1	-8.9	6.5	-0.6
Medial-rafting-screw [°]	0.1	2.0	-7.3	7.2	0.2
Posterior-rafting-screw [°]	1.2	2.0	-5.2	8.2	1.3

Table 2: 8-hole plate results [1]

Description	Mean	Std Dev	Min	Max	Median
Anterior-rafting-screw [°]	-1.2	2.2	-9.1	6.3	-1.1
Medial-rafting-screw [°]	-0.3	2.1	-7.5	7.3	-0.2
Posterior-rafting-screw [°]	1.0	2.0	-5.8	8.5	1.0

- Total mean angle of 2-hole plate: 0.2° [1]
- Total mean angle of 8-hole plate: -0.2° [1]

Conclusions

- With an overall mean angle of the three rafting screws relative to the Tibia Plateau of 0.2° and -0.2° these screw trajectories are very close to parallel.
- The pre-angled monoaxial locking rafting screws of the AxSOS 3® Titanium Proximal Lateral Tibia Plate show almost perfectly parallel trajectories to the tibia joint line of the mean patient.

References:

[1] SAAT-2017-27_report

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