



**Guided growth for angular correction in children:
a comparison of two tension band plate designs**

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This retrospective cohort study examined 20 patients (48 physes), 11 boys and nine girls, who were treated with hinge-plate or eight-plate. The mean age of the patients at surgery was 11.9 ± 2.6 years. The mean follow-up duration was 13 ± 2.7 months. The radiographic measurement of both distal femoral and proximal tibial deformity showed significant correction, with no difference between the hinge-plate and the eight-plate. Both screw divergence angle and the hinge angle showed significant changes at the last follow-up. The deformity correction of the distal femoral physis was quicker than the proximal tibial physis. The rate of mechanical femoral-tibial angle correction was $0.97^\circ/\text{month}$ if both femoral and tibial physes were treated.

Discussion:

Complications described in the literature during guided growth treatment are largely related to hardware failure or migration [10,22,23]. Mechanical failure of tension band plates occurs most commonly when the metaphyseal screw breaks at the site of insertion into the bone [24]. This was reported by Shin et al. [21] in their comparison study. We also reported **metaphyseal screw breakage in one patient treated with an eight-plate**. This screw breakage is likely because of **'three-point bending forces' caused by poor plate fitting onto the bone** [23]. Plate bending to contour the plate to the bone surface has been suggested to lower the stress at the screw insertion point and therefore the risk of screw failure [23]. In addition, **solid screws were recommended** instead of cannulated screws, particularly in **obese patients** [5,23,25]. Insertion of solid screws can be performed safely using fluoroscopy guidance to avoid physis injury [26]. Longer metaphyseal screws were also recommended to avoid screw pullout [15]. **The combination of plate-bending ability through the hinge and the use of solid screws in the H-plate construct should theoretically decrease the risk of screw failure** [24]. **The hinge allows continued correction** after the screw head/plate interface has reached maximal excursion.

