

# Transient Hemiepiphysiodesis by Using a Combination of Guided-Growth Plates and Staples for Correction of Idiopathic Bilateral Genu Valgum - A Case Report

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**Abstract:**

A 14 year old boy underwent a bilateral distal femoral hemiepiphysiodesis with guided growth plates and proximal tibial hemiepiphysiodesis with staples for the correction of genu valgum deformity. The preoperative intermalleolar distance in stance measured 15 cms. By 10 months follow up, there was complete correction of deformity and the implants were removed. At 3 years follow up, correction was maintained and there was no recurrence.

**Keywords :** Eight Plate, Idiopathic Genu Valgum, Staple

**Introduction:**

Adults with angular deformities of long bones are treated by osteotomy. Growing children can undergo a less traumatic option: hemiepiphyseal arrest with staples. Stapling was first reported by Blount and Clarke<sup>(1)</sup> in 1949 to treat angular deformities and length discrepancies of the lower limbs. The next advance in reversible hemiepiphyseal arrest was proposed by Métaizeau et al,<sup>(2)</sup> who used transphyseal screws. However, it is unclear whether epiphysiodesis with transphyseal screws truly is reversible. Eidelman and D’Agostino<sup>(3)</sup> described a new Blount staple design that has grooves to allow for more accurate, K wire guided insertion.

Staples can be left in place for as long as 2 years without causing permanent growth arrest. However, it has limitations like staple migration, bar formation, and under or over correction and recurrences.

Dr. Peter Stevens devised a novel device comprised of a two-hole plate and two screws and coined the term guided growth to describe its action on the growth plate.<sup>(4)</sup> This “eight-plate” is thought to be an improvement over staple because it theoretically does not compress the growth plate, works on tension band principle and it is more resistant to extrusion. We present our experience of using both eight plate and staple to cut down the cost, as eight plate is costlier than staple.

**Case Report :**

A 14 year old boy presented to us in opd of gcs medical college and hospital, in March 2013, with progressive

bilateral genu valgum deformity. The intermalleolar distance was 15 cms. No other abnormality was found. Proper X-rays were taken. Parental counselling was done and patient was operated.

Procedure - Both sides were operated in a single stage. Small incisions, physes were identified under IITV, plate was applied on distal medial femur extra periosteally in such a way that one screw introduced above physis and one below physis in a divergent way. Staples were introduced in proximal tibia medially. After discharge, regular follow up X-rays were taken. The deformity was fully corrected both clinically and radiologically at the end of 10 months. Implants were removed after one year.

**Figure 1: Pre-operative Clinical condition of patient**



**Figure 2: Pre operative & Post operative X-rays**



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**Figure : 3A, 3B, 3C: Follow up X-ray at 3<sup>rd</sup> month, 8<sup>th</sup> month and 10<sup>th</sup> month**



**Figure 4: Post operative photos with full correction & full ROM**



**Figure 5: X-rays after implant removal**



**Discussion :**

Genu valgum is a coronal plane deformity complex with medial angulation of knee as a primary component and femorotibial torsion, planus, pronated foot, medial laxity and subsequent lateral hypoplasia as secondary components. Physiological valgum usually corrects by 7 or 8 years, whereas pathological variant defined by tibiofemoral angle more than 2SD above mean is likely to progress over time and require treatment. (5, 6) Idiopathic genu valgum occurs when physiological forms of genu valgus do not resolve. (3, 4)

Excess valgum is characterized by circumduction gait, joint instability, anterior knee pain, secondary hip and ankle involvement. As gait mechanics is progressively disturbed multiple physes are subjected to bending, shearing and torsional forces, and if not intervened result in overall morbidity. (7) If tibiofemoral angle more than 15 degrees or intermalleolar distance of 10 cms persists after age of 10, it is unlikely that spontaneous correction will occur and needs surgery. Options for operative treatment include corrective osteotomy, partial epiphysiodesis and hemiepiphyseal stapling. (4, 5)

Osteotomy is limited by high morbidity with complications like malunion, failure of fixation and loss of correction. (8) Partial epiphysiodesis is simplest performed in majority in the past but was irreversible and success is based on precise timing and accurate prediction of remaining growth and its effect on valgus deformity. Hemiepiphyseal stapling is less invasive, does not damage the physis, and is reversible in event of overcorrection. But it has complications like staple migration, bar formation, recurrence.

Growth guided plates have emerged superior with many advantages like

**Surgeon’s benefits:**

- (1) Simple surgery and a day care procedure
- (2) Plate bends for anatomic fit and flexibility
- (3) Divergent screws act as a hinge to gently guide the natural growth
- (4) Fully threaded screws resist pull out and allow easy removal.

**Patient’s benefits:**

- (1) Minimally invasive
- (2) No cast
- (3) Immediate weight bearing
- (4) No physiotherapy

The greatest advantage was rate of deformity correction being 30% more faster than conventional stapling, as depicted within 10 months in our case.

**Conclusion :**

Growth guided plate is a perfect choice in the correction of some of the angular deformities of the

extremities in skeletally immature patients. A combination of eight plate and staple can be used to correct genu valgum, to lower down the cost.

**References:**

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