
Conclusion

Overall, the patients in this study were satisfied with the results. Younger patients planning for HTO should be advised about the benefits and risks of the procedure, specifically mentioning kneeling and scar formation. They should also routinely be informed about hardware removal later on. As long as adequate patient selection, precise operative correction, and careful management are achieved, there is a good chance of positive and long-lasting results with HTO in the treatment of tibia vara in this age group. The results of this preliminary study encourage us to further pursue earlier correction of mild-to-moderate tibia vara and look forward to its medium and long-term results.

SUMMARY

Genu varum is a common deformity associated with medial compartmental osteoarthritic knee with subsequent mechanical axis deviation and stress disturbances across the knee joint with medial compartmental loading which is aggravated by adduction moment during gait.

This varus deformity is pathologically started by varus instability then become fixed varus deformity of the osteoarthritic knee. Varus instability is either due to pathological bone changes or ligamentous elongation or both. Fixed varus deformity could be attributed to collapse of the bone medially with contracture of the medial soft tissues.

Preoperative measurements of the degrees of varus deformity is so essential to overcorrect the deformity and putting the knee in net valgus position 5 degrees to shift the arc of the body weight to the healthy lateral compartment which is better done with CT – scanogram of both lower limb.

Surgical techniques for correction of varus tibia have undergone many modification: the lateral closing wedge osteotomy, dome osteotomy proximal to the tibial tuberosity and a medial opening wedge tibial osteotomy.

Recently, Ilizarov technique has been used for correction of varus tibia. Each of these techniques has its advantages and disadvantages.

At the end of 1990s due to the introduction of fixation plate named **Puddu** into clinical practice, and relative simplicity of the technique, the procedure of medial open-wedge osteotomy gained popularity.

Lateral closing-wedge HTO was initially preferred, but medial opening-wedge HTO is becoming popular because it is simpler and allows adjustment in the coronal and sagittal planes. In addition, medial opening-wedge HTO avoids possible damage to the lateral aspect of the knee (ie, the peroneal nerve).

The ideal patient to perform HTO using the Puddu plate aged below 60 years with unicompartmental osteoarthritis in the medial joint space, varus deformity less than 15 degrees with no flexion deformity and good patient motivation to comply with postoperative rehabilitation program. He should be with ideal body weight, good bone quality and sufficient medial compartmental bony support.using iliac bone graft decrease time for union and decrease incidence of nonunion.

With meticulous selection of inclusion criteria, the success rate will be very high.

The crucial point of the operation is the opening of the metaphysis, where the osteotomy has cut the bone, at the desired angle of correction to allow introduction of the plate tooth.

The benefits of this technique is the short time of operation in comparison with other techniques of corrective osteotomy, Puddu plate gives rigid fixation which lead to early range of motion to the knee.

It can be performed without significant changes in patellar height or posterior tibial slope if specific intraoperative methods are used to prevent their occurrence. Analysis and control of sagittal changes in valgus open-wedge high tibial osteotomy should reduce the incidence of unwanted changes in patellar height and posterior tibial slope.

The complications of HTO include undercorrection, delayed union or non union, infection, internal fixation problems, intra-articular fracture, thromboembolic diseases and vascular complications.

Table (9): Hospital of Special Surgery Score (HSSS)

DESCRIPTOR	POINTS
Pain	
Rest pain	
Continuous: bed-chair status, narcotics	0
Intermittent: occasional narcotics	2
After excessive activity	5
Support required because of pain	
Double support only	10
Limits excessive walking	15
Single support only	20
No support required due to pain	
Limits routine walking	25
Limits excessive walking	30
Weather-related ache, starting discomfort	35
No pain	40
Stability (measured as total varus-valgus arc, extension)	
0°–6°	25
7°–9°	21
10°–12°	17
13°–15°	13
16°–18°	9
19°–21°	5
> 21°	0
Motion (measured as total passive arc)	
0°–10°	0
11°–30°	4
31°–50°	10
51°–70°	15
71°–90°	20
> 90°	25
Quadriceps strength (measured as 10% of normal for age and gender)	
> 75%, cannot break quadriceps power	10
50–74%, can break quadriceps power	5
< 50%, hard to move through arc of motion	0
Subtractions	
Extension lag, flexion contracture	
1°–15°	– 4
16°–30°	– 8
31°–45°	– 12
> 45°	– 16
Fixed varus (–) valgus (+) deformity (normal, +3° to +8°)	
Varus	
+ 2° to – 2°	– 4
– 3° to – 7°	– 8
> – 7°	– 12
Valgus	
+ 2° to + 13°	– 2
+ 14° to + 18°	– 4
> + 18°	– 6

Master Table

	<i>Age</i>	<i>Presenting symptoms</i>	<i>Side of deformity</i>	<i>Varus angle</i>	<i>Correction angle</i>	<i>Size of plate</i>	<i>Time spent to weight bear</i>	<i>Complications</i>
PATIENT 1	18	Deformity	Left	14	12	14	8 weeks	
PATIENT 2	22	Deformity	Left	8	10	8	6 weeks	
PATIENT 3	17	Deformity	Left	12	14	12	8 weeks	
PATIENT 4	18	Pain	Left	20	18	14	10 weeks	Delay-union
PATIENT 5	19	Deformity	Right	14	10	14	8 weeks	Under correction
PATIENT 6	30	Deformity	Right	8	10	8	8 weeks	
PATIENT 7	28	Deformity	Left	8	10	8	7 weeks	Superficial-infection
PATIENT 8	33	Deformity	Left	10	10	8	8 weeks	
PATIENT 9	38	Deformity	Left	8	10	8	8 weeks	
PATIENT 10	22	Deformity	Left	8	10	8	10 weeks	
PATIENT 11	25	Deformity	Right	7	12	8	8 weeks	
PATIENT 12	18	Pain	Left	8	12	10	7 weeks	
PATIENT 13	40	Pain	Right	8	10	8	8 weeks	
PATIENT 14	31	Deformity	Left	10	12	10	7 weeks	
PATIENT 15	26	Deformity	Left	8	10	8	8 weeks	
PATIENT 16	18	Deformity	Right	14	10	12	8 weeks	Under correction
PATIENT 17	17	Deformity	Left	12	14	12	8 weeks	
PATIENT 18	22	Deformity	Left	8	10	8	6 weeks	
PATIENT 19	18	Pain	Left	20	18	14	10 weeks	Delay-union
PATIENT 20	18	Deformity	Left	14	12	14	8 weeks	

N.B: wedge size depend on varus angle, approximately every 1mm of wedge measured at the base gives 1 degree of correction. puddu plate size depend on wedge size.⁽⁷⁵⁾

	Posterior tibial slope pre and post operative		HSS Score pre and 6 Months post operative	
	Pre -operative	Post-operative	Pre -operative	Post-operative
PATIENT 1	10	10	78	100
PATIENT 2	9	9	79	100
PATIENT 3	9	8	88	95
PATIENT 4	9	10	72	90
PATIENT 5	10	10	84	96
PATIENT 6	8	8	84	100
PATIENT 7	7	8	78	100
PATIENT 8	10	9	68	95
PATIENT 9	10	10	88	100
PATIENT 10	9	9	75	100
PATIENT 11	10	9	70	95
PATIENT 12	8	8	80	100
PATIENT 13	9	10	68	95
PATIENT 14	10	10	72	95
PATIENT 15	9	9	88	100
PATIENT 16	10	10	78	100
PATIENT 17	9	9	79	100
PATIENT 18	9	8	88	95
PATIENT 19	9	10	72	90
PATIENT 20	10	10	84	96

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الملخص العربي

إن الركبة الفحجاء تشوه شائع يصاحب الالتهاب العظمي المفصلي للحجرة الداخلية للركبة مما يتبع انحراف للمحور الميكانيكي واضطراب في توزيع الضغوط في مفصل الركبة مع زيادة الضغوط على الحجرة الداخلية للركبة والتي تزداد بالتقريب لحظة المشي.

هذا تشوه التقوس يبدأ مرضياً بتقوس غير ثابت ثم يتحول لتقوس ثابت للركبة المصابة بالالتهاب العظمي المفصلي. أما عن التقوس الغير ثابت فسببه اما تغيرات مرضية للعظم أو استئالة لأربطة الركبة أو كلاهما وأما عن تشوه التقوس الثابت للركبة فهو ممكن أن ينتج عن انهيار في الناحية الداخلية من العظم و انكماش في أنسجة الناحية الداخلية من الركبة.

إن قياسات درجة التقوس قبل إجراء العملية ضروري جداً لإصلاح التشوه والزيادة عليه لوضع الركبة في وضع خمس درجات أروح لنقل محور ثقل الجسم للحجرة الخارجية السليمة للركبة، ويفضل حساب درجة الاعوجاج بواسطة الأشعة المقطعية المبينة للطرفين السفليين كاملاً.

الطرق الجراحية لإصلاح تقوس الساقين مرت بالعديد من التعديلات : طريقة قطع جزء وتدي والغلق من الجهة الخارجية من العظم، وطريقة القطع العظمي على شكل قبة فوق نتوء عظمة الطنوب، وطريقة قطع عظمي والفتح على شكل وتد في الجهة الداخلية لعظمة القصبة وقد استخدمت حديثاً طريقة إيزاروف لإصلاح تقوس الساق ولكل من هذه الطرق مزاياها وعيوبها.

وفي نهاية عام 1990 وبسبب دخول نوع جديد من شرائح التثبيت إلى الممارسة الطبية يدعى (شريحة بودو) ، والبساطه النسبيه للتقنيه فقد اكتسبت طريقة قطع عظمي والفتح على شكل وتد في الجهة الداخلية لعظمة القصبة شعبية .

إن طريقة قطع جزء وتدي والغلق من الجهة الخارجية من العظم كانت مفضلة قديماً ولكن طريقة القطع العظمي والفتح على شكل وتد في الجهة الداخلية لعظمة القصبة أصبحت أكثر انتشاراً لأنها أسهل وتسمح بالتعديل على المستوى الأفقي والرأسي، هذا بالإضافة للقطع العظمي والفتح على شكل وتد في الجهة الداخلية لعظمة القصبة تمنع احتمالية إصابة الجزء الخارجي من الركبة (كإصابة العصب البيروني).