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Simultaneous Arthroscopic Anterior Cruciate Ligament Reconstruction and Medial Opening Wedge High Tibial Osteotomy Using Locked Plate and Synthetic Bone Graft (TUTOBONE®)

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Abstract

Background: High tibial osteotomy (HTO) has traditionally been used to treat varus gonarthrosis in younger, active patients. Varus malignment increases the risk of progression of medial compartment osteoarthritis and an HTO can be performed to realign the mechanical axis of the lower limb towards the lateral compartment, thereby decreasing contact pressures in the medial compartment. Anterior cruciate ligament (ACL) insufficiency may lead to post-traumatic arthritis due to altered joint loading and associated injuries to the menisci and articular cartilage. Understanding the importance of posterior tibial slope and its role in sagittal knee stability has led to the development of biplane osteotomies designed to flatten the posterior tibial slope in the ACL deficient knee. Altering the alignment in both the sagittal and coronal planes helps improve stability as well as alter the load in the medial compartment.

Aim of Study: Was to prospectively assess the effectiveness of management of varus angulated-ACL deficient knees by simultaneous arthroscopic ACL reconstruction and medial opening wedge high tibial osteotomy (HTO) using locked plate and synthetic bone graft (TUTOBONE®). The IKDC scoring system is used to assess the patients. Clinical outcomes are assessed preoperatively and at 20 months post-operatively.

Patients and Methods: This prospective study was conducted in Cairo University Hospital, Orthopedic Surgery Department. The study included 20 patients aged 18-40 years oldwith primary ACL insufficiency combined with varus knee. They were admitted to the hospital mainly for instability complaint. All patients underwent arthroscopically assisted anatomic single bundle ACL reconstruction using hamstring tendon (HT) graft fixed with biodegradable screws simultaneously with high tibial medial opening wedge osteotomy fixed with locked plate using iliac or synthetic bone grafts. All patients were followed prospectively for a minimum of 20 months. They were assessed clinically according to IKDC scoring system and radiologically by MRI and X-rays.

Results: Radiological Evaluation revealed that there was a significant improvement in the varus degree after surgery when compared with before surgery. Postoperatively, 60% of the patients showed normal alignment, 10% valgus (mean: 1° valgus) and 30% still varus (mean: 2.33 ° varus, range: 1-4°).

All clinical scores improved significantly after surgery. The mean IKDC subjective score went from 42.9 points (range 34.2 to 57.7 points), preoperatively, to 79.2 points (range 72 to 95 points) at the end of follow-up. Also, the final IKDC ligament evaluation showed marked improvement in both subjective and objective criteria, with 80% of the patients rated themselves as normal and their knees did not affect their level of activity while 20% of the patients considered their knees nearly normal with slight effect on the level of activity. No patients considered their knees abnormal.

Conclusion: It could be concluded that performing simultaneous arthroscopic ACL reconstruction and medial opening wedge high tibial osteotomy (HTO) using locked plate and synthetic bone graft (TUTOBONE®)was effective for obtaining a satisfactory correction angle, good clinical outcomes and lower complication rate.

Key Words: *Arthroscopy – Anterior cruciate ligament reconstruction – Medial opening wedge – High tibial osteotomy.*

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Introduction

HIGH tibial osteotomy (HTO) has been used in the treatment of varus gonarthrosis since being popularized by Coventry in the 1960s [1]. Although ligament insufficiency was originally considered a contraindication to HTO, realignment surgery is now considered an important part of the treatment algorithm for the unstable knee. HTO realigns the mechanical axis of the lower limb and unloads the affected compartment, thereby transferring weight-bearing forces to the healthy knee compartment [2] . Furthermore, biomechanical studies have shown that planned alteration of the posterior tibial slope can also help improve or restore stability in

the sagittal plane in ligament deficient knees [3]. Thus, valgus-producing HTOs, either lateral closing wedge (LCW) or medial opening wedge (MOW), should be considered as a preferred alternative to a knee arthroplasty, particularly in young, active patients with degenerative changes and concomitant cruciate injuries [4,5].

ACL deficiency alters knee kinematics and may contribute to accelerated degenerative changes, particularly in the medial compartment, with subsequent loss or injury to the meniscus or articular cartilage [6,7]. Osteotomy or realignment surgery can be used in this setting to treat both pain and instability by altering the posterior tibial slope, thereby changing the sagittal plane alignment [8,9] in addition to the coronal alignment. This can be performed in conjunction with a ligament reconstruction in either a simultaneous or staged fashion [10-16].

The simultaneous HTO and ACL reconstruction was preferred than the staged procedure, because performing the two procedures in one session is beneficial for the patient with one exposure to anesthesia, one hospital stay, one rehabilitation for the two procedures and they can return quickly to recreational and professional life. Many different studies agree with the simultaneous procedures, as the studies of Imhoff and Agneskirchner [17], Aggarwal et al., [18], Bonasia et al., [19] and Malahias et al. (2018) [11].

Patients and Methods

Participants:

From March 2012 to January 2015, this prospective study was conducted in Cairo University Hospital, Orthopedic Surgery Department. The study included 20 patients aged 18-40 years old with primary ACL insufficiency combined with varus knee. They were admitted to the hospital mainly for instability complaint. Table (1) shows the demographic data of the admitted patients.

Inclusion and exclusion criteria:

Inclusion criteria:

1- Tear of anterior cruciate ligaments besides varus knee deformity.
2- Patients of age between 18 and 40 years old.
3- Isolated injury or combined with other ligaments or meniscal injury.

Exclusion criteria:

1- All patients having advanced osteoarthritis large chondral lesions who are not candidate for ligament reconstruction.
2- All patients of age below 18y and above 40y.
3- Patients have low physical demands.
4- Patients complaining of obesity.
5- Patients complaining of poliomyelitis.
6- Patients complaining of muscle strain.

Table (1): Demographic data.

Total No. of patients	20
Age	The youngest=20y The oldest=40y Mean-=28y ± 6.23
Side of injury	Right knee=70% Left knee=30%
Mode of trauma	Sports=90% ADL=10%
Time from injury to surgery	The minimum=3 months The maximum=60 months Mean=14.6 months ± 13.6
Follow-up duration	20 months
Primary vs. revision ACL	Primary=90% Revision=10%
Associated Injury	25% no associated injury 75% MM, LM, small chondral lesions.
Varus type	Double varus=100% Triple varus= 0%
Preoperative Degree of varus	Range=6°-14° varus

MM: Medial meniscus. LM.: Lateral meniscus.

Assessment:

Clinical examination: All patients were examine preoperatively and postoperatively according to The International Knee Documentation Committee (IKDC) evaluation: IKDC Subjective Knee Evaluation and IKDC Knee Ligament Standard Evaluation (Lachman test - Anterior drawer test - Pivot shift - One leg hop test).

Radiological evaluation:

- X-ray: All patients were subjected to x-ray AP view (WB), lateral view, standing HKA °, varus stress test.
- MRI: All patients performed MRI to diagnose the torn ACL and any associated ligamentous injury.
- Informed consent was obtained before simultaneous combined operation.

Statistical analysis:

Data entry and master sheet were carried out using Microsoft Office Excel 2007. Statistical analysis was carried out using SPSS Statistical package for social science v.16. The analysis in-

cluded descriptive analysis (frequency and percentage for categorical data - mean & standard deviation for scale data).

Preoperative planning:

Evaluation of the mechanical axis in the coronal plane:

Preoperative standing X-ray hip knee ankle was performed for all patients. As shown in Fig. (1), Line (t) is from the center of the ankle through a point at the knee approximately 63% across the tibial plateau from medial to lateral. Line (f) is from the center of the femoral head through the same point. Line AB is the desired site of the osteotomy. Angle CD is the amount of opening wedge required to bring lines t and f together, so the mechanical axis is corrected to go through the joint at the desired 63% across the tibial plateau.

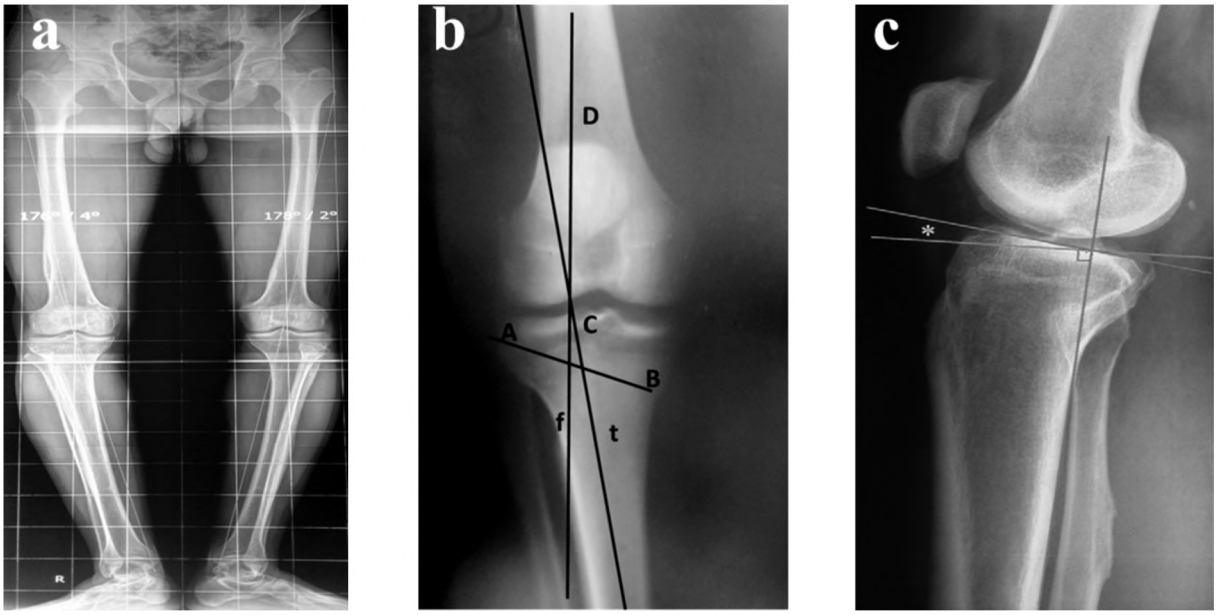

Fig. (1): (A): Long leg bilateral standing film, (B): Enlarged portion at the knee level showing the preoperative HTO planning, (C) Measurement of tibial slope.

Evaluation of the wedge size:

The wedge size was measured according to Hernigou Ph. (2002) **[20]**. For example, if the width of the tibia at the level of the osteotomy mark is 65mm, to obtain an angular correction of 16 ° on the frontal level, so it is necessary to get 18mm opening.

Surgical procedure:

Patients were spinally anesthetized and positioned supine with the affected knee flexed.

Examination under spinal anesthesia:

All knees were examined under spinal anesthesia for the pivot shift, anterior drawer test; varus stress test and Lachman test (Fig. 2). The findings were compared with the contralateral side and the previous preoperative examination. If pivot shift testing clearly demonstrated ACL insufficiency, a decision was made to harvest the graft before diagnostic arthroscopy. If the clinical examination was doubtful, diagnostic arthroscopy has to be done first.

Diagnostic arthroscopy:

A thorough diagnostic arthroscopy was performed with careful evaluation of the menisci for presence of tear. All articular cartilage injuries were noted and carefully graded.

Harvesting and preparation of the graft:

The grafts were harvested through a vertical skin incision on the anteromedial aspect of the tibia, extending 6-8cm distally to the joint line. This site of incision was also used for HTO. The hamstring tendon semitendinosus and gracilis (STG) was used forming 4 or 6 bundles graft.

Arthroscopic ACL Reconstruction was performed in the medial aspect of the lateral femoral condyle.

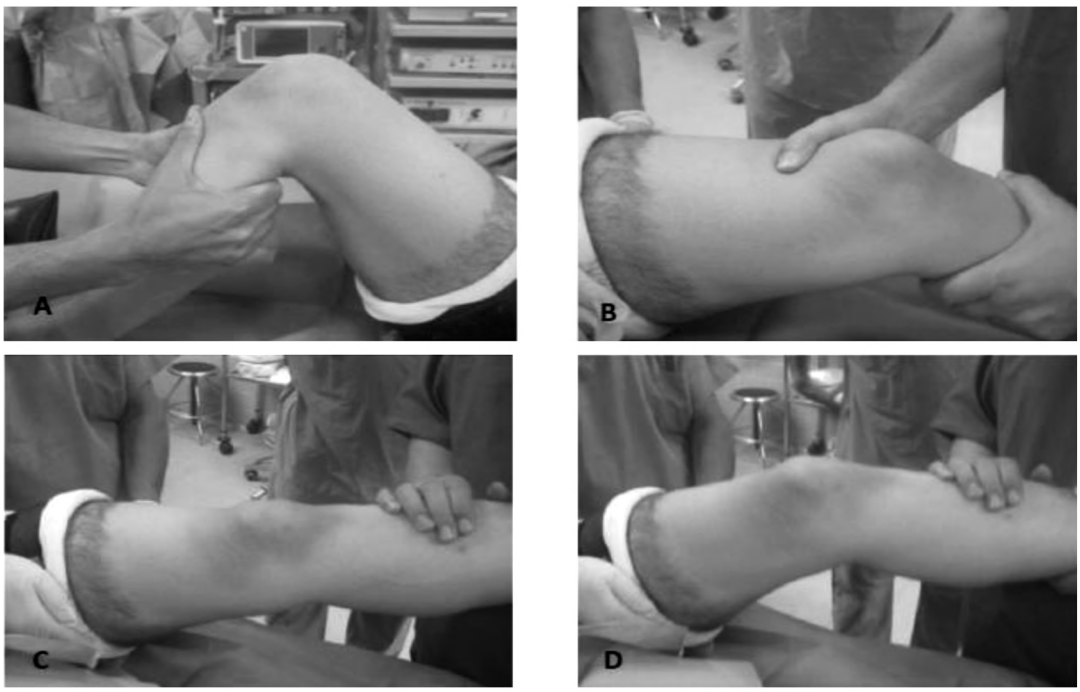

Fig. (2): Examination under anesthesia.

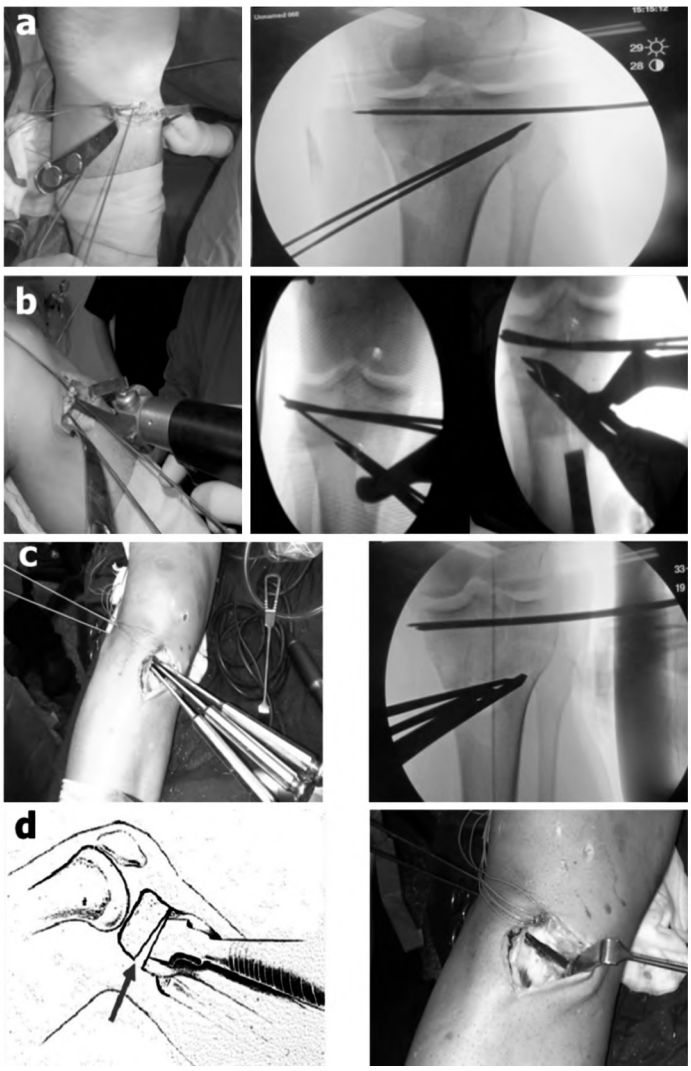

Fig. (3): (A): 2 k-wires parallel to joint line and the other 2 k-wires directed towards the upper head of the fibula. The length of k-wire was measured from the site of osteotomy at flare of the medial boundary of the tibia, (B): The upper half of the tibial tuberosity was osteotomized to prevent its fracture during tibial osteotomy, and then the osteotomy was performed parallel to the two-guide pin to prevent an intra-articular fracture and to cut the medial cortex only. The anterior and posterior cortices were completely interrupted but preserving a lateral hinge (0.5cm of intact bone), (C): Gradual opening of the osteotomy with preserving the lateral cortex of the tibia, (D): Opening the wedge medially and posteriorly.

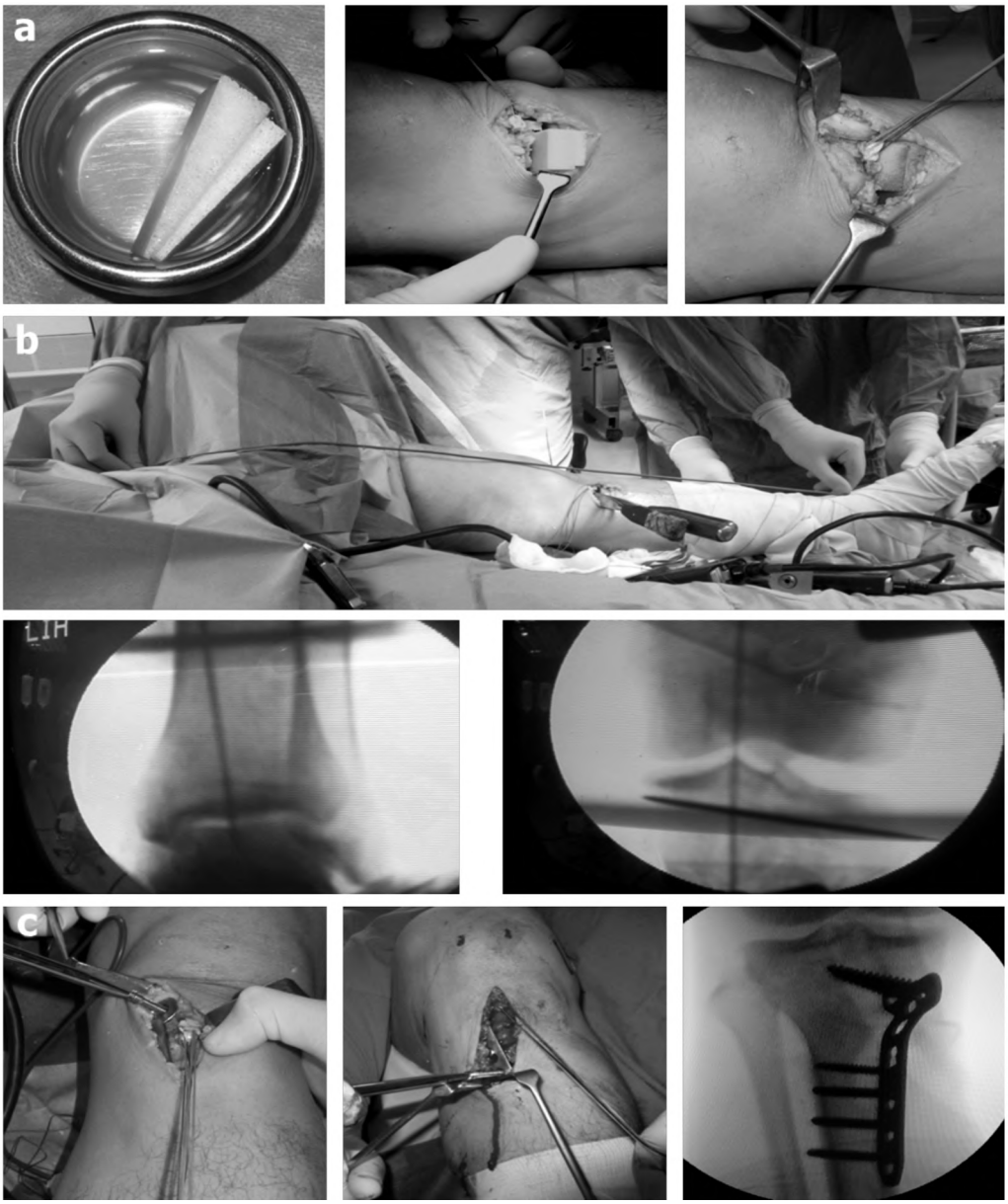

Fig. (4): (A): Graft insertion, (B): Checking the mechanical axis before plate fixation, (C): Plate fixation.

Steps of HTO:

- Step 1: Superficial medial ligament was dissected from the bone proximally up to the level of osteotomy. Anteriorly, a second retractor is placed under the patellar tendon. The procedure is facilitated by flexion of the knee.
- Step 2: Osteotomy.
- Step 3: Graft insertion and Plate Fixation.

Finally, tibial fixation of distal end of the reconstructed ACL was performed with interference screw followed by wound closure.

Postoperative rehabilitation:

According to protocol described by Miller RH. (2003) **[21]**. Patients were permitted non weight bearing for 6 weeks, and a full range of motion especially restoration of full knee extension (knee-hinged immobilizers). From weeks 1 to 4 included return to full ROM and increasing muscle contraction through full ROM. From 6 to 18 weeks, patients aimed to perform partial weight bearing with moderate daily living activities. By week 18, jogging, swimming, and cycling were permitted. Sports involving jumping, pivoting, or side stepping were permitted after 6 months.

Results

Varus realignment:

Radiological Evaluation:

There was a significant improvement in the varus degree after surgery when compared with before surgery. Postoperatively, 60% of the patients showed normal alignment, 10% valgus (mean: 1 ° valgus) and 30% still varus (mean: 2.33 ° varus, range: 1-4°).

Table (2): Summary of degree of alignment (preoperative vs postoperative).

	Preoperative	Postoperative	*p*-value
Mean degree of varus	10.65°±2.3	0.6°±1.4	0.001
Varus range	Min.=6° varus Max.=14° varus	Min.=1° valgus Max.=4° varus	
Posterior tibial slope	≥0-5 °=30% ≥5-10°=70%	≥0-5 °=20% ≥5-10°=80%	

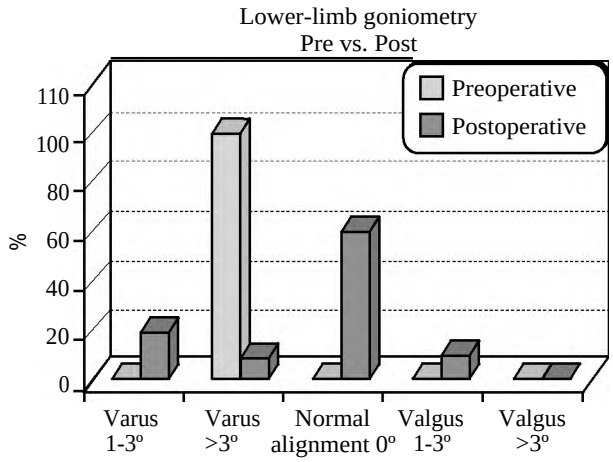

Fig. (5): Lower-limb goniometry (preoperative vs postoperative).

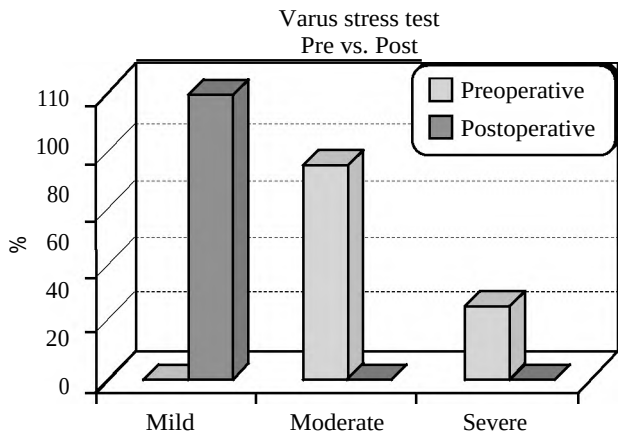

Fig. (6): Varus stress test (preoperative vs postoperative). lateral joint opening; Mild: 0-5mm, Moderate: 5-10mm, Sever: <10mm.

Varus stress test:

There was a significant improvement in the lateral joint opening after surgery when compared with before surgery. Postoperatively, all patients (100%) were found to have mild lateral joint opening (0-5mm).

IKDC evaluation:

It was found that there was a significant improvement in IKDC subjective knee evaluation score, IKDC knee ligament standard evaluationand knee function after surgery when compared with before surgery as shown in Table (3).

Table (3): Overall IKDC evaluation of studied patients.

	Preoperative	Postoperative	*p*-value
Mean subjective IKDC score	45.2±7.9	79.2±4.2	0.001
IKDC ligament evaluation	C=35% D=65	A=65% B=20% C=15%	
Knee function	C=65% D=35%	A=80% B=20%	

A: Normal knee function. C: Abnormal knee.
B: Nearly normal knee. D: Severely abnormal.

Effect on activity scale:

On a scale from 0 to 3, postoperatively, 80% of the patients reported that their knee did not affect their level of activity (score 0 from 3) while 20% of the patients gave their knee a score of 1 from 3 affecting their level of activity.

Symptoms:

There was a significant improvement in the giving way, the pain level and the swelling level after surgery when compared with before surgery.

Table (4): Giving way, Pain and Swelling of studied patients.

	Giving way (%)	Pain (%)	Swelling (%)
No giving way, pain or swelling	85	80	85
Activity level 1: Jumping, Pivoting	15	20	15
Activity level 2: Heavy manual work	0	0	0
Activity level 3: Light manual work	0	0	0
Activity level 4: ADL	0	0	0

Range of motion:

Preoperatively 19 patients (95%) had full range of knee motion and only one patient had hyperextension. Postoperatively, all patients had maintained their full knee extension.

Ligament examination:

Lachman test and the anterior drawer test:

There was a significant improvement in the Lachman grade and the anterior drawer grade after surgery when compared with before surgery.

Table (5): Lachman grade and anterior drawer grade of studied patients.

	Lachman grade (%)	Anterior drawer grade (%)
Grade 0: Normal	70	75
Grade 1: Near normal	20	10
Grade 2: Abnormal	10	15
Grade 3: Severely abnormal	0	0

Harvest site pain:

According to the IKDC form, patients were asked to report both the presence and severity of donor site symptoms (tenderness, irritation or numbness) while at rest. Seven patients (35%) reported symptoms from their graft site. No patients graded their symptoms as greater than mild. The pain of one patient was improved after plate removal.

One leg hop test:

There was a significant improvement in the one leg hop score after surgery when compared with before surgery.

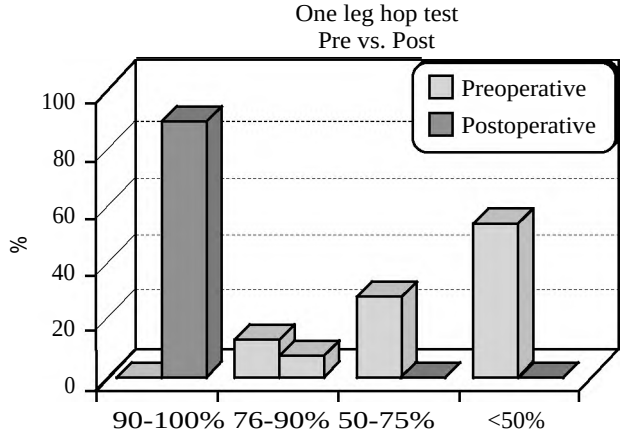

Fig. (7): One leg hop test.

Complications:

Only 10% of the patients experienced mild superficial infection postoperatively with 380 fever which resolved on I.V. antibiotics without adverse effects on the final outcome and no need for debridement. Only 15% of the patients experienced intraoperative fracture of lateral tibial plateau which was treated by percutaneous fixation with two canulated screws. No vascular injury, deep vein thrombosis (DVT), tourniquet polsy or nerve injury were experienced postoperatively. One patient experienced stiff knee which was managed later by arthroscopic adhesinolysis. Some thin patients felt discomfort with the inserted plates and only one patient underwent second surgery for plate removal two years after the main operation.

Return to pre-injury level of activity:

80% of the patients returned to their preinjury level of activity at the end of the follow-up period, 10% turned to office work mainly, 5% changed the job and 5% used assistant. No retear was observed.

Discussion

Patients with untreated ACL insufficiency develop unicompartmental (in most cases medial) tibiofemoral osteochondral or chondral damage **[7,22,23]**.

Congenital varus malignment (primary varus) in the untreated ACL insufficiency cases often promotes the degenerative changes due to the mechanical unicompartmental overload. On the other hand, varus malignment can secondarily be caused or enlarged with the development of medial osteochondral destruction or meniscus deficiency (double varus). Persistent knee instability in a double varus situation with increasing unicompartmental damage leads to varus thrust with posterolateral instability (triple varus) **[24]**.

Clinical symptoms in these patients arise both from instability (giving way) and degenerative changes (load-dependent medial pain in daily living or sports). Therefore, in the current study any patient with ACL deficiency and varus knee was candidate for HTO when there are manifestations of medial joint overload, medial joint tenderness, medial chondral wear visualized by arthroscopy or MRI, medial menisectomy either partial or complete and manifestations of lateral and posterolateral soft tissue weakness or varus thrust. These criteria arestated also by many previous studies **[10,11,14,17,18]**.

HTO for the treatment of medial knee osteoarthritis is an established method, having been described by many authors as being effective in case of unicompartmental destruction in young patients in whom no or only very minor lateral degeneration is present [2-5].

The commonest role for HTO is to relief medial joint overload symptoms through redistributing joint force across the knee joint in the coronal plane, relief lateral joint tension symptoms and decrease intraosseous venous hypertension. However, in more recent years, there has been increasing biomechanical and clinical interest in adjusting the angle of the posterior tibial slope to control ligament imbalances in the sagittal thus, add satiability for the knee by decreasing the tibial slope that helps for anterior stability, tighten the lateral and posterolateral structures by adaptive shortening of these soft tissue structures after HTO and protect the reconstructed ACL from failure as the forces are increased over them if varus alignment was not corrected first.

The problem of the combination of varus deformity and ACL deficiency cannot be addressed by osteotomy alone or ACL reconstruction alone, but a plan is put according to the patient's condition to choose between ACL reconstruction alone, HTO alone or a combination of both ACL reconstruction and HTO [11,12,17,18,25]. However, there is no agreement among the authors about which group of patients requires only one and which requires more than one procedure and whether they are to be performed staged or simultaneously.

Simultaneous HTO and ACL reconstruction was studied by Aggarwal et al. (2005) who put the patient's age and activity level as the determinant factors, they consider that in very active patients <40 years old both procedures can be performed simultaneously, while in less active old patients both procedures should be staged [18]. Imhoff and Agneskirchner state that there are no absolute contraindications for the simultaneous procedures in older patients [17].

Others like Noyes et al. [24] and Spahn [25] who consider that the combination of ACL reconstruction and HTO in one session is associated with major complications as the operative time is prolonged, extensive exposures and incisions around the knee, the rehabilitative process becomes more difficult. A recent study by Willey et al., concluded that the risk of complications of simultaneous and staged ACL reconstruction and HTO is similar [26].

Medial opening wedge HTOs have become increasingly popular over the past 2 decades. The procedure of medial opening wedge HTO is attractive because the peroneal nerve is not in jeopardy and disruption of the proximal tibiofibular joint and lateral ligaments is avoided [27]. The theoretical advantages of opening wedge over closing wedge include: (1) The lateral structures remain intact in themedial opening wedge osteotomy and act as a buttress making collapse into varus less likely, (2) A significant reductions in knee adduction moment are achievable without a large over correction of the mechanical axis angle (MAA), (3) Restoration of anatomy with or without addition of bone to the diseased medial side, (4) The ability to achieve predictable correction in both coronal and sagittal planes, (5) The ability to adjust correction intraoperatively, (6) The requirement for only one bone cut, (7) Avoidance of proximal tibiofibular joint disruption and invasion of the lateral compartment, and (8) The relative ease of combining with other procedures such as ACL reconstruction. The disadvantages of this procedure include the creation of a defect that requires bone graft with attendant harvest morbidity, increasing PTS by 2 to 5 degrees due to anterior position of the metal plate,and a theoretical higher risk of non-union, as well as the longer period of restricted weight bearing postoperatively [28].

Success in medial open-wedge osteotomy depends largely on sound application of the technique. The determination of the exact localization of the osteotomy site accurately under a good fluoroscopic control, meticulous care not to fracture lateral cortex during opening of the osteotomy site, frequent assessment of the correction angle at every step of the operation, avoidance of overcorrection, the selection of an appropriate size of the locked plate and the bone graft that fit for the osteotomy gap are important details increasing the success rate of this procedure.

The plates used in opening-wedge HTO are either a short spacer plate (Aescula plate or Puddu plate) or a rigid long plate (Tomo Fix plate or Proximal tibial T-locked plate). The locked plate showed sufficient residual stability whereas the Puddu plate required additional lateral fixation [29].

In the present study, Proximal tibial T-locked plate was used with TUTOBONE® which is a wedge bone graft material made from solvent-preserved bovine cancellous bone. This bone graft is used for implantation in human in areas where cancellous bone rather than cortical bone in required.

For open-wedge procedures, two factors seem essential so as not to modify the tibial slope **[30]**.

1- Release of the posterior soft tissues: In the study reported by Marti et al. (2004), the group with anterior cruciate ligament rupture had undergone complete osteotomy of the posterior tibial cortex as well as release of the posterior soft tissues. In this group, the increase in tibial slope was only 1º versus 3.2º in the group in which these precautions had not been taken **[31]**.

2- The position of the wedge during the open-wedge procedure and then the position of the plate: The more the wedge is positioned anteriorly, the more the slope increases. Rodner et al. **[32]** and Rubino et al. **[33]** demonstrated that a plate placed too anteriorly induces an increase in tibial slope. Laprade et al. **[34]** showed that the anteromedial position of the plate increases tibial slope by 4.3º versus only 1.0º when it is posteromedial. Other studies recommend positioning the plate as close as possible to the posteromedial corner and performing a complete posterior osteotomy **[30]**.

Therefore, in the present study the plate was placed in the posteromedial corner and soft tissue was released to avoid increasing PTS more than 10º to avoid increasing the load on the ACL.

Autologous bone graft is the "gold standard" for the augmentation, but due to donor site morbidity some concerns remains. Several authors have reported good results with allograft **[35-37]**, despite the fact that it is associated with a higher failure rate when compared to autograft **[38]**. Recent study showed that HKA angle value was preserved in the patients received xenograft locking plate, with adequate maintenance of the correction **[39]**.

In the present study, The subjective assessment at the end of the follow-up period showed that 80% of the patients rated themselves as normal and their knees did not affect their level of activity while 20% of the patients considered their knees nearly normal with slight effect on the level of activity. No patients considered their knees abnormal.

In the present study, all patients showed varus deformity preoperatively (mean: 10.65 ° varus, range: 6-14°). At the end of follow-up, 60% of the patients showed normal alignment, 10% valgus (mean: 1 ° valgus) and 30% still varus (mean: 2.33 ° varus, range: 1-4 °). It was intended to put patients into normal alignment (neutral correction) while more valgus correction was avoided as more correction would slacken the PLC. For the patients who remained in slight varus deformity, it might be due to errors in determination of the size of wedge or due to the lack of bone stock as the distance from joint line to the tibial tubercle is variable from person to another.

The results of the present study are superior to those obtained by Trojani et al. (2014) who reported that 65% of the patients showed valgus, 24% normal alignment and 10% still varus, at the end of follow-up, having mean valgus of about 2.5 (5 ° varus to 11 ° valgus) **[40]**.

These results are also better than those obtained by Maffulli et al. (2013) who performed opening wedge HTO fixed with locking Puddu plate and xenograft, and found that immediately after surgery, the HKA angle went from 9.1 ±5.2° in varus to 3.1±4.8° in valgus **[39]**.

At the end of follow-up, no patient had more than 3mm increase in the lateral joint opening (mild lateral joint opening), and none had an increase in external tibial rotation. These results are similar to the results obtained by Noyes et al. (2000) who performed both staged and simultaneous ACL and HTO with closing wedge and stated that at the end of follow-up no patient had more than 2mm of increase in lateral joint opening, and none had an increase in external tibial rotation **[24]**.

In the present study, the preoperative tibial slope was 6.06° and increased postoperatively to 6.32°. This slight increase in the PTS is due to soft tissue release and positioning the plate and wedge graft posteromedially. These results are in accordance with those obtained by Ducat et al. (2012) who reported preoperative PTS of 5.6 ° which increased after opening-wedge HTO to 6.2 ° **[30]**.

Conclusion:

The genovarum deformity is not always in one plane so it should be corrected via biplanar osteotomy combines both coronal and sagittal planes. Therefore, the medial opening wedge HTO was preferred as it enables predictable correction in both coronal and sagittal planes besides the ability to adjust correction intraoperatively and using one incision for both harvesting graft and osteotomy.

Proximal tibial T-locked plate was used with synthetic bovine bone graft (TUTOBONE®). T-locked plate provides superior stability in both compression and torsion compared with a short spacer plate. The allograft was used to avoid donor site morbidity and shorten the time of the combined operation. Moreover, this synthetic bone graft provides higher mechanical properties than β-TCP

with lower risk of post-operative compression and correction loss. Stable fixation can be accomplished with a locked plate with graft, without loss of correction.

It could be concluded that performing simultaneous arthroscopic ACL reconstruction and medial opening wedge high tibial osteotomy (HTO) using locked plate and synthetic bone graft was effective for obtaining a satisfactory correction angle, good clinical outcomes and lower complication rate.

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إعادة بناء الصليبى الأمامى بالمنظار المتزامن مع استعدال التقوس الانسى بعمل شق عظمى مخروطى داخلى مفتوح باستخدام شريحة ذاتية الغلق وترقيع عظمى مخروطى اصطناعى (TUTOBONE®)

الخلفية : إن القصور فى الرباط الصليبى الأمامى للركبة المصاحب بتقوس أنسى قد يؤدى إلى عدم ثبات الركبة وتزايد مستوى الخشونة وتأثر الغضروف الداخلى.

الهدف من الدراسة : لذا تهدف هذه الدراسة إلى تقييم عملية إعادة بناء الرباط الصليبى الأمامى للركبة المصاحب لاستعدال التقوس الانسى بعمل شق عظمى مخروطى داخلى مفتوح باستخدام شريحة ذاتية الغلق وتر قيع عظمى مخروطى غير متجانس (فى نفس العملية). وقد تم استخدام وترى الضلة الشبة وترية والجراسيليس فى كل الحالات إن إجراء العمليتين فى عملية واحدة يقلل من تعرض المريض للتخدير ويجعله يمكث فى المستشفى لمرة واحدة مع فترة إعادة تأهيل واحدة للعمليتين معاً كما يؤدى إلى سرعة عودته لحياته الطبيعية. كما حرص الجراحون على ألا تزيد الفترة الزمنية للعملية عن ساعتين لتجنب حدوث مضاعفات كما أنهم حرصوا على استخدام شق جراحى واحد للعمليتين.

المرضى والطرق : تم إجراء هذه الدراسة فى مستشفيات جامعة القاهرة على عدد ٢٠ من المرضى يتراوح أعمارهم بين ١٨–٤٠ سنة وكلهم من الذكور. قد كانت الشكوى الرئيسية للمرضى هى عدم ثبات الركبة. وكانت الأصابة الرياضية هى السبب الأساسى لمعظم الاصابات وقد تم التأكد من تشخيص تمزق الرباط الصليبى الأمامى مع وجود تقوس أنسى فى مفصل الركبة لكل الحالات. وقد تم تقييم الحالات وفقاً لنظام IKDC قبل وبعد العملية.

النتائج : كان هناك تحسن ملحوظ فى الشعور بالألم والارتشاح وثبات الركبة حسب تقييم نظام IKDC. وقد حدث تحسن ملحوظ فى درجة التقوس الانسى للركبة فقد تم استعدال التقوس لتصبح على استقامتها الطبيعية فى ٦٠٪ من المرضى.

الأستنتاج : أن الأجراء المتزامن لعملية إعادة بناء الرباط الصليبى الأمامى واستعدال التقوس الأنسى بعمل شق عظمى مخروطى داخلى مفتوح باستخدام شريحة ذاتية الغلق وترقيع عظمى مخروطى قد حسن من الحالة العامة للركبة. وقد أثبتت الدراسة أن التقييم الجيد للركبة وعلاج أى تشوه اروحى بالركبة أو ضعف بالاجزاء الخلفية للركبة يقلل من فشل الرباط الصليبى الذى تم استعاضته.