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## Results of tibial defect in TKR managed with bone cuts and cement without tibial stem augmentation

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### Abstract

**Introduction:** Osteoarthritis of the knee is one of the most common causes of disability among elderly population. OA clinically presents as flexion with varus deformity. Various methods to manage bone defects during TKR surgery have been described like use of Bone cement, Bone grafts, metal wedges and augment and Extension of tibial stem in various permutations and combinations. In this study we are evaluating the results of tibial bone defect.

**Aims and Objectives:** To study the Result of Tibial defect in TKR managed with Bone cuts and Cement

**Materials and Methods:** A Prospective study of 55 total knee replacements performed over 42 patients for osteoarthritis knee by trained surgeons at a tertiary care centre in the Department of Orthopaedics, BJ medical college, Civil hospital Ahmedabad between May 2019 to September 2021. The mean follow-up study time was 3 years.

**Observation and Results:** All the operated patients were followed up for mean period of 3 years. The defects in our study were solely managed with bone cuts and cement with or without screw augmentation.

**Conclusion:** Tibial bone defect even more than 5 mm but less than 10 mm can be effectively managed with bone cuts and cement alone or screw fixation without any bone grafts or tibial augmentation.

**Keywords:** Osteoarthritis of the knee, total knee arthroplasty (TKA), bone cuts, cement

### Introduction

Osteoarthritis of the knee is one of the most common causes of disability among elderly population. There is increase in incidence and prevalence of the disease due to our social culture, increase in life expectancy and sedentary lifestyle.

Among various methods available for treatment of OA knee Total knee replacement is the Gold standard treatment to achieve painless, mobile and stable knee joint. The success of total knee arthroplasty (TKA) relies on patient selection, prosthesis design, soft tissue balancing, limb alignment, placement of component and restoration of joint line. Limb alignment is the most important factors determining the longevity of TKA

OA clinically presents as flexion with varus deformity. For successful TKR, tibial bone defects needs to be adequately managed in order to prevent varus malalignment and restore the joint line in order to increase the longevity of TKA. Otherwise, it will may lead to early loosening of tibial component or even early failure of TKA.

Various methods to manage bone defects during TKR surgery have been described like use of Bone cement, Bone grafts, metal wedges and augment and Extension of tibial stem in various permutations and combinations. In this study we are evaluating the results of tibial bone defect managed with bone cuts and cement with or without screw augmentation.

### Aims and Objectives

To study the result of Tibial defect in TKR managed with Bone cuts and Cement

### Materials and Methods

This is a Prospective study of 55 total knee replacements performed over 42 patients for osteoarthritis knee.

Time frame: May 2019 to September 2021

### Inclusion criteria

- Documented patients with Primary osteoarthritis knee aged > 50 years with medial tibial defect and varus deformity as per Watanabe classification. AND
- Patients in which Intra-op medial tibial defect is  $\leq 10$  mm

### Exclusion criteria

- Patients with Intra-op medial tibial defect >10mm.
- Valgus knee with defect
- Less than 6 months follow-up.
- Revision total knee arthroplasty.
- Patients who are not willing to participate or not came for follow up.
- Patients with Rheumatoid arthritis.
- Patients <50 years of age.

This is a prospective study of 55 Total knee Arthroplasty surgery done over 42 patients over 3 years duration. The defects in our study were solely managed with bone cuts and cement with or without screw augmentation.

The average 47 years old and the oldest being 80 years. Out of the total 42 patients in our study 25 were females and 17 were males, stressing on the fact that more of the females ultimately get the total knee replacement done than male. All the patients were mobilized on 1<sup>st</sup> post-operative day barring few restrictions like, lack of confidence on patient's behalf, ICU admissions. The Pre-operative defect in tibial medial side measured in X-ray ranged from 10mm to 17mm with average defect being 12.6 mm while the Intra-operative medial tibial defect remaining after standard tibial cut being taken ranged from 2mm to 9mm with average being 4.65mm which is managed with bone cuts and cement and in two patients aided with screw fixation. We did not perform any type of augmentation in any of these patients under study.

- Overall females are more likely to get OA knee than males.
- Total duration of follow up in our study was 15 months (6 month-25months)
- Mean age in our study is 63.66. Bone defects present at relatively older age as it occurs in advanced stage of the disease and also in our country present at later stage
- In our study average flexion in preop period was 95 degree and average flexion in postop period was 117.9 degree.
- In our study average defect size found intra-op was 4.65mm and was managed with bone cuts and cement with or without screw augmentation.
- Radiolucency at bone-cement or prosthesis-cement interface was seen of size less than 1mm in total of 6 patients. 2 out of them were followed for upto 2 years and there was no progression seen. There was no change in radiolucency over observed period of time. The patients with implant failure or the patients who still have relatively less improvement post surgery were specifically checked for such lines of radiolucency but was not seen in them.
- AORI guidelines states that <5mm defects should be managed with cement and bone cuts, 5-10 mm defects be managed with screw fixation with or without grafts, defects of >10 mm or in which >50% tibial plateau is lost morcelized bone graft or some sort of augmentation is

must. Thus in our study we only included the patients in whom Intra-op defect was less than 10mm. Yet we managed many patients in whom defect was 5-10 mm with maximum defect of 9mm intra-op with cement only or with screw without any sort of bone grafts, augmentation or long stems.

### Clinical Cases

1. A 55 year old female with left knee pain with tibial defect of 4mm size managed with bone cuts and cement



Fig 1a: Pre-op X-ray



Fig 1b: Post-op X-ray



Fig 1c: Follow-up X-ray at 6 months

2. 62 year female with OA knee Left side with defect 7mm



Fig 2a: Pre-op X-ray

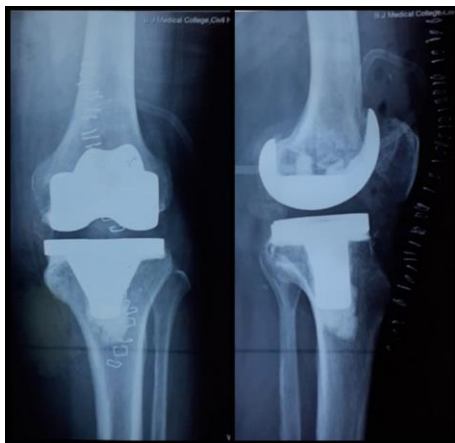


Fig 2b: Post-op X-ray



Fig 2c: Follow-up Xray

3. Case of 63 year old male with 8mm tibial defect in right knee managed with bone cut and cement along with screw fixation



Fig 3a: Pre-op X-ray

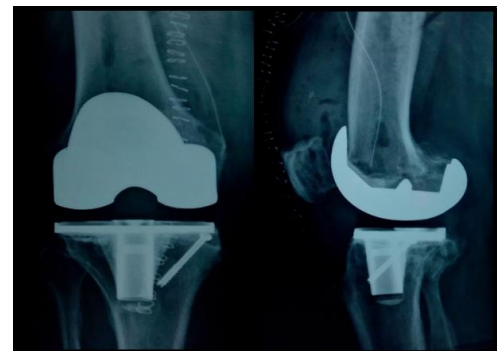


Fig 3b: Post-op X-ray

**Conclusion**

Thus we conclude from our study that tibial bone defect even more than 5 mm but less than 10 mm can be effectively managed with bone cuts and cement alone or screw fixation without any bone grafts or tibial augmentation. Various advantages are.

It enables preservation of as much bone as possible for future revision surgery if needed. 2) It is cost effective and simple because metal augments, internal fixation device and stem extension are not needed. It can be used in same manner in any defect >2mm and can be used 10mm. 3) Bone implant interface in case of metal augments, cones sleeves forms a complex shape causing continuous concern for implant loosening. 4) With longer stem and implants or large bone grafts there can be relatively increased chance of infection. In our setup bone cement is mixed with heat resistant antibiotic and thus there is very less chance of infection. 5) Metal augments, cones and long stem is relatively costly and thus by properly assessing the defect and with conservative approach rather than radical in case of small defects it becomes cost effective for the patient. However longer duration of follow up and more number of patients are required to further strengthen the study.

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