



## ALTERNATIVE TO FREE FIBULA RECON, IRRETRIEVABLE FLAP IS MEDIAL FEMORAL CONDYLE FLAP FOR HEAD AND NECK RECONSTRUCTION -A REVIEW OF LITERATURE.

### Plastic Surgery

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### ABSTRACT

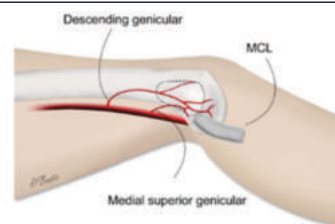
This article aimed harkening back the flap which is forgotten by surgeon in head and neck reconstruction defects. This flap harvesting is tricking but good microvasculature is attained suits the recipient and functions moderately. Main aim to remember the Flap is Medial Femoral Condyle Flap (MFCF) used for head and neck reconstruction we aimed to Harvesting, Defects were reconstructed in head and neck, Vitality of the flap explained. We had reviewed the article with keywords medial femoral condyle flap, osteocutaneous flap, craniofacial and neck deformities recon in search engines like doaj, pubmed, scopus, cochrane, web, mayoclinic, elsevier, research gate, case reports, series Randomised clinical trials (RCT) prospective studies, cohort studies cadaveric studies. The reconstruction by using MFCF had better result for head and neck defect reconstruction.

### KEYWORDS

MEDIAL FEMORAL CONDYLE FLAP, OSTEOCUTANEOUS FLAP

### INTRODUCTION

Advent of Utilizing the Medial Femoral Condyle Free Flap (MFCF) is a multifaceted choice for the treatment of upper and lower extremities [1-15]. This is used where the recipient site has loss of bone or necrosis or avascularization or arthrosis, mainly this is osteocutaneous flap. MFCF is used for reconstruction upper and lower extremities reconstruction [1-17]. Until few surgeons had used this flap for head and neck reconstruction defects. This flap was first identified by Kobayashi .et .al proposed to use this flap in craniofacial and neck deformities reconstruction. The osteocutaneous flap was first performed by Taylor et al that is Free fibula flap, revolutionized the field of reconstruction. The anatomy consideration of the flap as follow's Tissue: A bone flap harvested from the medial femur at the knee. The flap contains vascularized cortical and cancellous bone. There is no Innervation. Blood supply: Descending genicular artery, a branch of the superficial femoral artery. The medial superior geniculate artery can be used alternatively, but it has a shorter vascular leash. Artery: 1to2mm. venacommitatevenous supply.



The medial femoral condyle is supplied by a plexus of vessels from the descending genicular artery and the medial superior genicular artery. The flap is marked by identifying the vascular plexus on the medial condyle and incorporating a component of the network in the flap. The medial collateral ligament (MCL) and joint capsule of the knee are spared and not incorporated into the flap.

The flaps of widely uses in the recipient site described (Fig :1)

10.1136/bmj.n71For more information, visit: <http://www.prisma-statement.org/>.

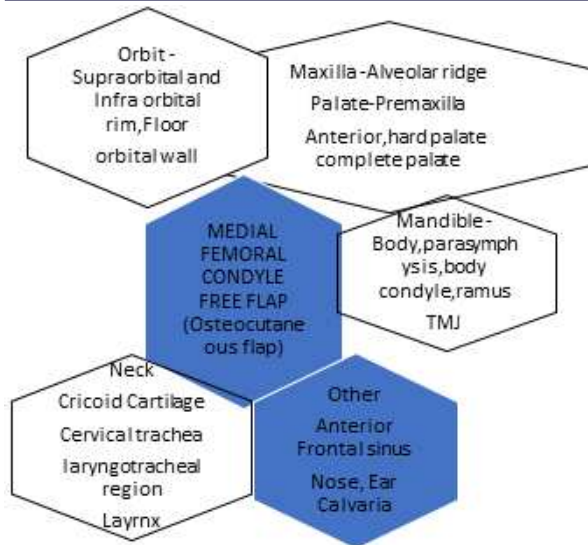


Fig no : 2- Recipient site -

So, the viability of flap is explained, results were satisfactory in those studies. So aimed to bygone all the surgeon where FFP is contra indicated be used their MFCF can be used for reconstruction.

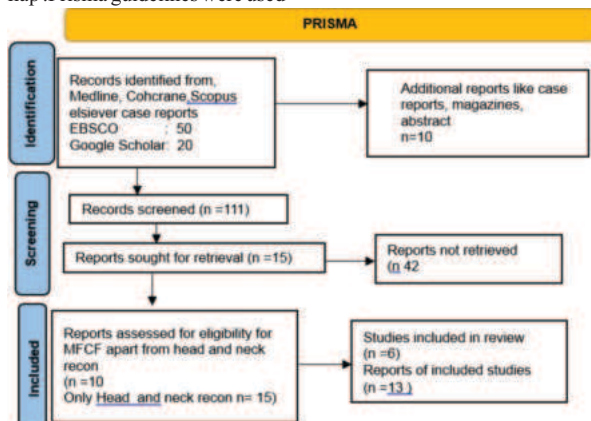
Table :1 Comparisons Of Free Flaps To The Other Commonly Used Flaps

Comparisons of the Free MFC Flap to Other Commonly Used Free Osseous Flaps

Sl. no	Type of flap	Pedicle artery and length	Osseous defect size reconstructed	Advantages
1	Medial femoral condyle	Descending genicular	6	Suitable for paediatric defects because it had minimal donor site morbidity.
2	Fibula	Peroneal	25	Used for segmental defects No cartilage, high rate of delayed donor site morbidity
3	Radial Forearm	Radial	12	Thin and Long pedicle,
4	Iliac Crest	Deep Circum flex iliac	6	High quality bone cartilage
5	Scapula	Circumflex	14	Abundant soft tissue, geriatric population

**MATERIAL AND METHOD**

We conducted a search on MEDLINE (through PubMed), EBSCO and Google Scholar articles doaj of last 19 years i.e., between 1985 and 2024 for terms medial femoral condyle flap, osteocutaneous flap, Free flap. Prisma guidelines were used



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi:

**RESULTS**

According to the materials and method following Prisma guidelines articles had proposed that MFCF had good results when compared to another osteocutaneous flap in the field of reconstruction. The article had explained about anatomy and used in reconstruction of maxillofacial reconstruction in the table 3.

Table :3

Sl. No	Title / Author	Level Of Evidence	Head And Neck, lower And Upper Reconstruction, anatomy	Summary
1.	Descending genicular artery. Branching patterns and measuring parameters: A systematic review and meta-analysis of several anatomical studies. Thomas Ziegler.et.al	I	-	Anatomy of the flap mainly focused on vascular anatomy
2.	Detailed vascular anatomy of the medial femoral condyle and the significance of its use as a free flap. Laurenz Weitgasser.et.al.	IV, case - series	-	Different distribution vascular anatomy focused, useful for harvesting flap mainly cortico-periosteal flap.
3	The corticoperiosteal medial femoral supracondylar flap: anatomical study for clinical evaluation in mandibular osteoradionecrosis.	IV, case reports	yes	Sound clear anatomical knowledge for harvesting potential. Various anatomical patterns of the pedicle are frequently encountered; branches can be exclusive when raising the flap. Imaging techniques were recommended before surgery.
4.	Microvascular medial femoral condylar flaps in 107 consecutive reconstructions in the head and neck Christian Brandtner , Johannes Hachleitner.et.al	I	yes	This flap suited for reconstructions of alveolar ridge, midface, calvaria, skull base and part of the larynx with poor recipient sites. Every flap has its own pros and cons. used in head and neck recon.
5.	Expanding Indications of the Medial Femoral Condyle Free Flap: Systematic Review in Head and Neck Reconstruction. Niki.et.al	I	Yes	In this paper medial femoral condyle free flap is an effective reconstruction for the head and neck deficits, because it had versatile nature, low complication profile at both recipient and donor site. Ease of harvest.

6.	Medial femoral condyle free flap for head and neck reconstruction. Jacek Banaszewski.et.al.2019.	I	Yes	Successfully used for reconstruction of head and neck construction for mainly orbit maxilla, mandible, and tracheal scaffolds.
7.	Indications for the microvascular medial femoral condylar flap in craniomaxillofacial surgery.Oliver Christian Thiele et.al	III	yes	This flap is used for maxillofacial reconstruction is done temporomandibular joint recon pseudarthrosis of the jaws, osteonecrosis of the jaw and skull and augmentation after radiation. Safe and reliable flap. Small sized defects goof vascular flap
8.	Utilization of a Chimeric Medial Femoral Condyle Free Flap for Mandibular Osteoradionecrosis. Kong Krit Chaiyasate.et.al. 2022.	II	yes	This flap is best suited for osteoradionecrosis cases of the mandible. This provides pain resolution and healing of intraoral soft tissue defects and may halt the progression of ORN of the mandible.
9.	The Medial Femoral Condyle Free Flap for Reconstruction of Recalcitrant Defects in the Head and Neck.Kuldeep Singh.et.al2021	II	yes	Small mandibular defects reconstruction ,salvage after osteoradionecrosis defects .
10.	The vascularized medial femoral condyle free flap for reconstruction of segmental recalcitrant non-union of the clavicle.Tony Chieh-Ting Huang.et.al.2019	Level IV; Case Series; Treatment Study	Yes	Good option for recalcitrant bone non-unions of the clavicle whereas for larger vascularised flaps is not opted. Effective and offers only minimal.
11.	Free Medial Femoral Condyle Flap for Reconstruction of Scaphoid Nonunion: A Systematic Review.Kiane J Zhou.et.al.2022.	I	yes	Versatile flap.

## DISCUSSION:

The remaining craniofacial bones and neck structures were originally incorporated into the use of the free MFC flap since it was first proposed by Kobayashi et al.<sup>16-17</sup>. In addition to the other widely recognized vascularized osseous flaps, the primary objective of this study was to determine the exact significance of the free MFC flap in head and neck reconstruction through a thorough investigation of the existing literature<sup>1-10</sup>. Given the high success rate of 96.4% observed in the examined studies, stability of the reconstruction over long-term follow-up, minimal donor site complications with relatively faster recovery, simple dissection, and simultaneous approach to flap harvesting and recipient site. The MFC flap has distinctive characteristics due to the fact it's possible to efficiently release periosteum, and it has a high potential for bone regeneration<sup>11-17</sup>. When

compared to other alternatives, the free MFC flap shows greater benefits than limitations overall; its primary drawback is that it can only address smaller-scale defects. The indication of free flap is depicted in TABLE 4.

Due to its advantages over other often used osseous flaps, the free MFC flap is more versatile as well pliable, structurally strong, and stable over the long term. Now anatomical consideration plays a major role while flap selection. Kazmers, N.H. et al.2018 proposed in his systemic review that MFCF is used for reconstruction of deformities upper and lower extremities. (i)Doi et al proposed that MFCF without trochlear cartilage is used for the reconstruction of Waist or proximal pole non-union with AV complications were Heterotopic ossification in periosteal flap, treated while removal of K wire<sup>15</sup> (ii)Proximal pole non-union with AVN, carpal collapse was proposed by Jones et al 2008. (iii)Hannada et al 2014 proposed that the flap is used for Non-union with AVN. (iv)Fei et al 2015 proposed Waist, proximal pole, non-union. (v &vi) Burger et.al. 2013,2014 proposed that the flap is used for reconstruction defects proximal pole non-union with AVN and Kienbock disease. This flap is used for reconstruction of acute open fracture with osteomyelitis proposed by henry et al 2015. Traumatic proximal phalanx bone loss and metacarpal bone loss, osteomyelitis is the condition where MFCF is used for reconstruction by Wong et.al 2014, Ruston et.al 2015, Rodriguez<sup>25</sup>Vegas .et .al 2011, Sammer et al 2009. Traumatic osseous defect was reconstructed by Henry.et.al 2009, Doi et al 1994 non- union, osteomyelitis of metacarpal reconstruction. Infected non-union were reconstructed by Sakai et.al 1991.Acute open fracture, osteomyelitis proposed by henry 2015 phalanx recon. Non-union and osseous defect (trauma) were reconstructed by MFCF is experimented by Vegas et. al .2012, Rodriguez<sup>25</sup>Vegas .et .al 2010, Fei.et.al 2015 atrophic non-union. DIP arthrodesis non-union dominant index reconstructed by grant et.al 2015. Sigmoid notch incongruity after distal radius fracture, Dysvascular crush injury, chronic hamatometacarpal/hamatotriquetral dislocation reconstructed by del penal et. al 2012 and, del penal et al 2007.Clavicle was reconstructed by MFCF in the clavicle non-union by Hamada.et.al 2014, vegas.et.al 2012, Choudry et.al 2008, Fuchs et.al 2015 in irradiated or infection or non-union. Infected non-union by Doi et .al 1994. For smaller defects, (< 3 cm) the gold standard becomes less clear, as harvesting such flaps leads to substantial morbidity at the donor site. When vascularisation of the transplant bed is compromised by scarring, inflammation, or infection, using non-vascularised bone grafts has several disadvantages, including wound dehiscence, infection, and non-union. C. Brandtner et.al 2015 was the first person used for the reconstruction of maxillofacial defects<sup>11</sup> James P Higgins et al 2017 and 2020 proposed that MFCF is used for scaphoid and Lunate reconstruction mainly treatment of recalcitrant scaphoid proximal pole non-unions and advanced avascular necrosis of the lunate. Apart from MFCF there is one more flap for lower and upper extremities reconstruction that is Medial femoral trochlea osseocartilaginous which has highly vascularized flap used in the reconstruction of scaphoid non-union mainly on the proximal pole. In this technique the unhealed portion resected and analogous convex segmented of cartilage bearing bone from MFT. Rate of union with acceptable motion and pain relief is good. Prognosis is excellent.

## CONCLUSION:

In this study the studies reviewed are medial condylar femoral flap used in head and neck reconstruction. Mainly this flap is versatile in head and neck reconstruction apart from lower and upper neck reconstruction with robust osteogenic potential. Easy to harvest with minimal flap failure. Good Armamentarium for microvasculature replicates the head and neck reconstruction. Apart from MFCF the Medial femoral trochlea reconstruction is good for scaphoid recon and try for maxillofacial deformity reconstruction. Further studies were required, surgeon knowledge will be challenging.

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