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## Original article

# Modifications to Norman's procedure for hypermobility of the TMJ

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## ABSTRACT

**Background:** Norman's procedure is a well known surgical technique for the hypermobility of temporomandibular joint. In this procedure after performing glenotemporal osteotomy the augmentation of the zygomatic root of the temporal bone is done by placing a bone graft from the iliac crest to prevent forward movement of the condyle beyond the eminence. This paper describes the clinical outcome of two modifications added to Norman's procedure. In addition to the conventional procedure inferiorly based pedicled flap from the temporal fascia was sutured to the antero-lateral aspect of the capsule. Intraorally pterygoid disjunction was carried out only in those case in which hypermobility was associated with painful temporomandibular joint disorder.

**Methods:** Modified Norman's procedure was performed in 10 patients (4 females & 6 males), 7 of them were bilateral and 3 cases were unilateral under general anesthesia.

**Results:** After one year follow up in none of the cases graft failed or rejected though recurrence along with TMJ pain was noticed in 2 cases.

**Conclusion:** This technique is versatile but long-term follow up on a larger number of patients is necessary to be able to draw definitive conclusions.

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## Introduction

Chronic subluxation of the temporomandibular joint (TMJ) is defined as an excessive abnormal excursion of the condyle where the condylar head moves anterior to the eminence on wide opening, while the mouth can be closed again without any assistance. Acute subluxation is associated with pain due to internal derangement of TMJ. Radiographically, the condyle is found translating anterior to articular eminence. Acute dislocation of the TMJ is a condition where the condyle moves suddenly anterior to the articular eminence and gets locked. Chronic recurrent dislocation is characterized by a condyle that slides over the articular eminence catches briefly beyond

the eminence and then returns to the fossa. Most patients find that they can reduce their condyle to the normal position. Acute mandibular dislocation is a displacement of the condyle anterior to the articular eminence with complete separation of the articulating surfaces and fixation in that position. The etiology of hypermobility is unclear. The pathogenesis of hypermobility is secondary to weakness or laxity of the capsule. Patients often complain of difficulty in mastication. Management of hypermobility remains a challenge, despite a large number of conservative and surgical techniques with variable results described in literature.<sup>1,2</sup> This paper describes the clinical outcome of two modifications added to Norman's procedure.<sup>3,4</sup> In addition to the conventional procedure

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inferiorly based pedicled flap from the temporal fascia was sutured to the antero-lateral aspect of the capsule. Intraorally pterygoid disjunction was carried out only in those case in which hypermobility was associated with painful temporomandibular joint disorder.<sup>5</sup>

## Materials and method (Table 1)

Reconstruction of the TMJ was performed in 10 patients (4 females & 6 males), 7 of them were bilateral and 3 cases were unilateral. The mean age was 40 years (range 28–54). The inclusion criteria were all cases of hypermobility of TMJ refractory to conservative management who were fit to undergo surgery under general anesthesia. True cases of Internal derangement were excluded from the study. TMJ Patient selection was based on impairment of TMJ function during speech, mastication and laughing. The clinical history pertaining to dietary habits involving wide mouth opening, betel nut chewing and trauma did not contribute to the etiology of hypermobility in any of the cases. All patients had been treated non-surgically at various centers of our organization for at least 1 year using analgesics, sedatives and anti-inflammatory medication with or without splints. Clinical examination revealed the usual signs and symptoms of TMJ dysfunction: (a) Pain in the preauricular, facial and cranial areas, (b) Joint noises during mandibular movements, (c) Disturbance of mandibular movements and excessive mouth opening while the condyle in anterior relation to the eminence. Pain was noticed in 6 patients in the preauricular region with radiation to temporal region. Joint click during mandibular movement were noticed in all the cases. All patients were edentulous with no alteration in vertical dimension. The

mean mouth opening was 48 mm (range 42–52) (Fig. 1). Radiographic examination (TMJ open & closed mouth) was performed prior to surgery for each patient. No significant change in the outline of articular eminence, tubercle, glenoid fossa and mandibular condyle was noticed (Fig. 2). The diagnosis was chronic habitual subluxation in 7 patients and recurrent dislocation of the TMJ in 3 patients. The TMJ was approached through Popowich & Crane's modification of Alkayat & Bramley's preauricular incision to permit anterior mobilization of the tissue and exposure of the capsule of the TMJ, temporal fascia and the zygomatic root of the temporal bone without damaging the facial nerve. An osteotomy of the zygomatic root of the temporal bone was carried out by creating a gap of 0.5 cm directed at 45 towards the joint, just in front of the articular tubercle and eminence (Figs. 3 and 4). A piece of cortico-cancellous bone, taken from the iliac crest of 0.5 cm × 1.5 cm, was placed into the gap, without fixation, to prevent forward movement of the condyle beyond the eminence (Fig. 5). An inferiorly based pedicled flap from the temporal fascia was elevated and sutured to the antero-lateral wall of the capsule as an anchoring procedure (Figs. 6 and 7). The surgical procedure was performed without opening the capsule to avoid further damage to the intra articular structures. Intraorally pterygoid disjunction was carried out in 6 cases (Fig. 8). A soft diet was advised postoperatively for all patients for 4 weeks.

## Results

At one year follow up the average mouth opening was 38 mm (range 37–40mm). In one case transient facial nerve palsy was noticed along the distribution of temporal and zygomatic

**Table 1 – Results following surgery.**

S.No.	Gender	Age	Side	Diagnosis	Associated TMJ pain	Preop mouth opening	Pterygoid disjunction	Mouth opening at 1 year post surgery	Transient facial nerve palsy	Follow up	Recurrence	TMJ pain post surgery
1.	M	32	R & L	Chronic Subluxation	Yes	49	Yes	40	No	1 year	Yes	Yes
2.	M	28	R	Recurrent dislocation	Yes	48	Yes	38	No	1 year	No	No
3.	F	28	R	Recurrent dislocation	Yes	42	Yes	38	No	1 year	Yes	Yes
4.	M	38	R & L	Chronic Subluxation	No	49	No	40	No	1 year	No	No
5.	M	42	R & L	Chronic Subluxation	Yes	44	Yes	39	No	1 year	No	No
6.	M	40	R & L	Chronic Subluxation	Yes	46	Yes	36	Yes	1 year	No	No
7.	M	39	R & L	Chronic Subluxation	Yes	48	Yes	38	No	1 year	No	No
8.	F	54	R & L	Chronic Subluxation	No	52	No	38	No	1 year	No	No
9.	F	48	L	Chronic Subluxation	Yes	48	Yes	38	No	1 year	No	No
10.	F	50	R & L	Recurrent dislocation	No	49	No	37	No	1 year	No	No

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