

## Original Research

### Role of Splints in Internal Derangement of TMJ

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#### ABSTRACT:

**Background:** To evaluate the role of splints in internal derangement of temporomandibular joint. **Materials & methods:** A total of 40 patients were enrolled. The age group was 18\_50 years who had been diagnosed with internal derangement of the TMJ in the form of reciprocal clicking. Subjects were divided into two groups. For statistical analysis, SPSS software was used. The independent Student t-test was used to compare the two groups at each follow-up interval. The significance level was set at  $p \leq .05$ . **Results:** A total of 40 subjects were enrolled. The maximum mouth opening significantly increased over the follow-up period in both groups. During preoperative period, the hard splints showed mouth opening of 25.85 and soft showed 25.06. At 4 months, the soft splint group showed significantly higher values of mouth opening. **Conclusion:** Soft occlusal splints showed better results after 4 months of use.

**Keywords:** TMJ, soft splint, internal derangement.

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#### INTRODUCTION

The temporomandibular joint (TMJ) is a compound articulation formed from the articular surfaces of the temporal bone and the mandibular condyle. Both surfaces are covered by dense articular fibrocartilage. Each condyle articulates with a large surface area of temporal bone consisting of the articular fossa, articular eminence and preglenoid plane. The TMJ functions uniquely in that the condyle both rotates within the fossa and translates anteriorly along the articular eminence. Because of the condyle's ability to translate, the mandible can have a much higher maximal incisal opening than would be possible with rotation alone. The joint is thus referred to as "ginglymodiarthrodial." A combination of the terms ginglymoid (rotation) and arthrodial (translation).<sup>1</sup> The temporomandibular joint (TMJ) is interrelated with other neuromuscular components. Defects of any of these components or factors preventing them from working in harmony could lead to temporomandibular disorders (TMDs). The American Academy of Orofacial Pain classifies TMD broadly into myogenous and arthrogenous types, both of which can be present at the same time, making diagnosis and treatment more difficult.<sup>2</sup> TMDs have a multifactorial

etiology, with bruxism, psychological illness, and traumatic injuries from mastication, extreme mouth opening, and dental treatments being considered as the main causes.<sup>3-6</sup> TMDs are characterized by clicking and pain, either confined to the TMJ region or radiating to the eyes, shoulder, and neck. Headaches, tinnitus, jaw deviation, locking, and limited mouth opening are common symptoms.<sup>7,8</sup> Pain is the most crucial symptom for which patients seek medical care.<sup>9</sup> TMJ locking could progress to complete jaw motion inability. Symptoms range from minor to disabling.<sup>10</sup> Dental occlusal splinting and permanent occlusal adjustment have been the mainstays of TMJ disorder treatment. Occlusal splint therapy may be defined as "the art and science of establishing neuromuscular harmony in the masticatory system by creating a mechanical disadvantage for parafunctional forces with removable appliances." Occlusal splint is a diagnostic, relaxing, repositioning, and reversible device. According to the glossary of prosthodontic terms [8th ed.], "occlusal splint is defined as any removable artificial occlusal surface used for diagnosis or therapy affecting the relationship of the mandible to the maxilla. It may be used for occlusal stabilization, for treatment of

temporomandibular disorders, or to prevent wear of the dentition.” A common goal of occlusal splint treatment is to protect the TMJ discs from dysfunctional forces that may lead to perforations or permanent displacements. Other goals of treatment are to improve jaw-muscle function and to relieve associated pain by creating a stable balanced occlusion.<sup>11</sup> Hence, this study was conducted to evaluate the role of splints in internal derangement of temporomandibular joint.

**MATERIALS & METHODS**

A total of 40 patients were enrolled. The age group was 25–50 years who had been diagnosed with internal derangement of the TMJ in the form of reciprocal clicking. Subjects were divided into two groups. They were treated for 4 months soft splints or a hard flat occlusal splint fabricated from transparent acrylic resin (hard splint group). Monthly follow-up visits were performed during the treatment period. Before treatment and 1, 4 months after treatment, all parameters of TMJ function were measured (pain visual analog scores, clicking of the TMJ, and range of mouth opening). For statistical analysis, SPSS software was used. The independent Student t-test was used to compare the two groups at each follow-up interval. The significance level was set at  $p \leq .05$ .

**RESULTS**

A total of 40 subjects were enrolled. The maximum mouth opening significantly increased over the follow-up period in both groups. During preoperative period, the hard splints showed mouth opening of 5.85 and soft showed 25.06. At 4 months, the soft splint group showed significantly higher values of mouth opening.

**Table 1: mouth opening during follow up**

	Mean value	
	Hard	Soft
Preoperative	25.85	25.06
1 m o n t h	28.36	26.98
4 m o n t h	33.55	34.11

**Table 2: pain scores in both groups**

	Mean value	
	Hard	Soft
Preoperative	7.56	7.85
1 m o n t h	5.76	6.43
4 m o n t h	0.55	0.31

Pain significantly decreased in both groups throughout the entire follow-up period, with no significant differences between the two groups at any interval. At preoperative, hard splints showed value of 7.56 and soft showed 7.85. Clicking scores significantly decreased in both groups throughout the follow-up period. There was no statistically significant difference between the two groups at any follow-up.

**Table 3: Clicking scores in both groups**

	Mean value	
	Hard	Soft
Preoperative	2.86	2.73
1 m o n t h	2.72	2.65
4 m o n t h	1.1	1

**DISCUSSION**

Splint therapy is used to reduce the excessive joint load, relax the muscles of mastication, and support the regenerative processes in the joint. There are three types of occlusal splint used for the treatment of disc displacement without reduction (DDwoR): stabilization, distraction, and protrusive splints.<sup>12,13</sup> Protrusive splint aimed to re-establish physiological disc condyle relation. However, the stability of disc recapture affected by the range of disc displacement. In cases of DDwoR protrusive splint does not lead to disc recapture, but has a pain-relieving effect.<sup>13</sup> Stabilization splint increases the vertical dimension of the occlusion. The occlusal contacts are located bilaterally on the splint; this may lead to a significant decrease in symptoms of the closed lock.<sup>14</sup> The distraction splint causes a greater intraarticular stress release. The occlusal contacts are placed mostly in the posterior part of the splint. Stabilization splint seems to be more effective than distraction splint in closed lock therapy.<sup>15</sup> Hence, this study was conducted to evaluate the role of splints in internal derangement of temporomandibular joint. In the present study, a total of 40 subjects were enrolled. The maximum mouth opening significantly increased over the follow-up period in both groups. During preoperative period, the hard splints showed mouth opening of 25.85 and soft showed 25.06. At 4 months, the soft splint group showed significantly higher values of mouth opening. A study by Seifeldin SA et al, included 50 patients (age range: 24–47 years) who had been diagnosed with MPD or ID of the TMJ in the form of reciprocal clicking. Patients were divided into two groups. They were treated for 4 months with either a vacuum-formed soft occlusal splint constructed from 2-mm-thick elastic rubber sheets (soft splint group) or a hard flat occlusal splint fabricated from transparent acrylic resin (hard splint group). All parameters of TMJ function showed significant improvement in both groups during the follow-up period, with a statistically significant difference between the two groups at the 4-month follow-up visit.<sup>16</sup> In the present study, pain significantly decreased in both groups throughout the entire follow-up period, with no significant differences between the two groups at any interval. At preoperative, hard splints showed value of 7.56 and soft showed 7.85. Clicking scores significantly decreased in both groups throughout the follow-up period. There was no statistically significant difference between the two groups at any follow-up. Another study by Young AL et al, showed internal derangements of the temporomandibular joint are conditions in which the articular disc has become

displaced from its original position the condylar head. Relevant anatomic structures and their functional relationships are briefly discussed. The displacement of the disc can result in numerous presentations, with the most common being disc displacement with reduction (with or without intermittent locking), and disc displacement without reduction (with or without limited opening). These are described according to the standardized Diagnostic Criteria for Temporomandibular Disorders, as well as the less common posterior disc displacement. Appropriate management usually ranges from patient education and monitoring to splints, physical therapy, and medications. In rare and select cases, surgery may be necessary. However, for the majority of internal derangements, the prognosis is good, particularly with conservative care.<sup>17</sup> Occlusal adjustment involves repositioning the mandible to a centric position by using prosthodontic or orthodontic appliances. Intraoral occlusal splints are designed to provide even and balanced occlusal contact without forcefully altering the mandibular rest position or permanently altering the dental occlusion. Usually made of processed hard acrylic, a splint is worn on the teeth like retainer or a removable denture. Types of occlusal splints include the stabilization splint, modified Hawley splint, and repositioning splint.<sup>18</sup> Nevertheless, the use of occlusal splints to alleviate TMD signs and symptoms is controversial.<sup>19</sup>

## CONCLUSION

Soft occlusal splints showed better results after 4 months of use.

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