

# Rehabilitation of a Completely Edentulous Patient using TENS to record Functional Borders and Cheek Plumpers for Esthetics

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## ABSTRACT

The facial disfigurement associated with the loss of teeth has greater psychological effect on the patient than the actual loss of teeth. Presented herein, is a novel, precise and accurate technique of performing border molding using transcutaneous electric nerve stimulation (TENS). The electronic stimulator is programed to deliver precisely controlled, uniform stimuli transmitted by transcutaneous electrical neural stimulation through fifth and seventh cranial nerves.

Plumping the cheeks by using cheek plumpers attached to the conventional complete denture using magnets was also done. The greatest advantage lies in the fact that they are completely detachable.

**Keywords:** Transcutaneous electric nerve stimulation, Cheek plumper, Complete denture.

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## INTRODUCTION

In dentistry, transcutaneous electric nerve stimulation (TENS) has been used only as a test for pulp vitality. Broader use of transcutaneous stimulation for diagnosis of muscle problems and to initiate as well as control muscle contractions during clinical procedures was introduced to dentistry with the advent of the Myomonitor in 1969. Dentists have since been advantageously utilizing the instrument in a broad spectrum of clinical procedures.<sup>1-8</sup>

Since the long-term success of dental procedures requires an initially relaxed and balanced muscular complex, the first step in the use of the Myomonitor is repetitive stimulation to relax the musculature. The instrument can also be used for a variety of other clinical procedures: production of a muscularly oriented maxillomandibular registration, diagnosis, occlusal adjustment, construction of complete dentures and fixed or removable partial dentures, impressions, including border molding for complete and removable partial dentures, treatment of temporomandibular joint syndromes, reduction of postoperative swelling and possible transcutaneous neural stimulation for relief of pain.<sup>1,9,10</sup>

The term esthetics was coined in year 1750 which is 'blend of knowledge to give beauty', in contrast to 'science of logic of truth'.<sup>11</sup> Denture esthetics is defined as the effect produced by a dental prosthesis that affects the beauty and attractiveness of the person.<sup>12</sup>

Denture esthetics starts with the very first step as one of the objectives of impression making. Due to aging, a prosthodontist has to handle a whole lot of losses: loss of teeth, alveolar process, tonicity of musculature, elasticity of skin as well as impairment of function.<sup>13</sup> The key to esthetic replacement to all losses is to support and harmonize the collapsed lower third of face with upper part with various treatment modalities present at the hand of prosthodontist.

## CASE REPORT

A 55-year-old male patient in good general health, conscious of his appearance, with edentulous maxillary and mandibular ridge reported to Dr DY Patil Dental College and Hospital, Pimpri, Pune. His prime concern for denture was functional purpose but, in addition, he also insisted for improving esthetics. On examination, low rounded maxillary and mandibular ridges were present and the cheeks appeared to be sunken.

Border seal is a biologic factor that involves intimate contact of denture borders to the surrounding soft tissues. Importance of seal in retention has been emphasized by Jacobson, Krol, Fisher, Klein and Broner.<sup>14</sup> Correct accommodation of impression material in peripheral sulcus is equally important for good retention. Border molding is defined as determining the extension of prosthesis by using tissue function or manual manipulation of tissues to shape the border areas of an impression material.<sup>12</sup> The manual manipulation is operator dependent whereas the tissue function is patient dependent.

Disadvantages of conventional border molding are variable reproducibility of size and shape of peripheral prosthetic shape, under/over extension of the impression due to incorrect operator induced movements or absurd patient movement, procedure is dependent on physical, physiological and psychological status of patient and operator. Due to these disadvantages, there is a need to find an alternative to conventional border molding.

In 1971, Jackelson advised TENS for border molding as a possible alternative to conventional border molding. It is applied with low frequency. It induces small electric current to cause controlled twitching of muscles. It is mainly used for muscle relaxation and pain relief in medical field. TENS has four surface electrodes. It has an amplitude of variable frequency that can be applied to achieve controlled contraction of the muscles.<sup>15</sup>

Cheek plumpers are the prosthesis used for supporting and plumping the cheeks to provide good appearance. They are often used in order to mimic the fullness of cheeks.<sup>16</sup>

Appropriate treatment plan was decided taking into consideration disadvantages of conventional border molding and sunken cheeks. Border molding was planned using TENS and cheek plumpers were to be attached to maxillary denture using magnets.

Primary impression was made with impression compound (Fig. 1). Custom tray was prepared with cold cure acrylic resin with a spacer of 1.3 and 2 mm short from the sulcus depth.<sup>17</sup> Border molding was carried out using TENS as follows:

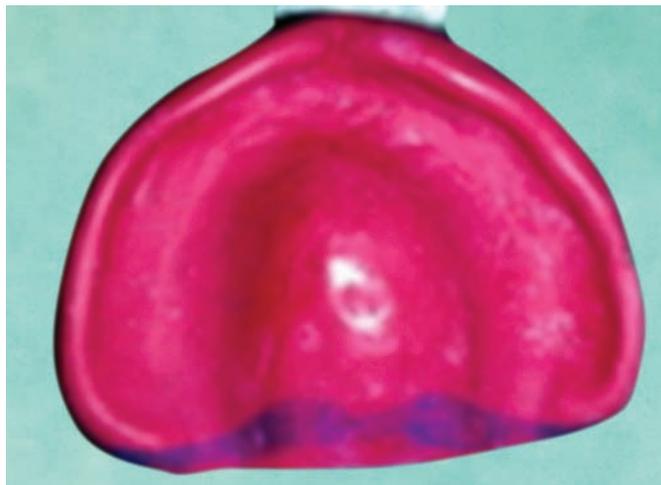
Placement of electrodes: two electrodes were placed in front of the tragus and two at the back of the neck to complete the circuit<sup>15</sup> (Fig. 2).

Muscle deconditioning: according to the patient's tolerance, the intensity of TENS was adjusted to 4/sec and frequency to 3 Hz. This was continued for 45 minutes<sup>15</sup> (Fig. 3).

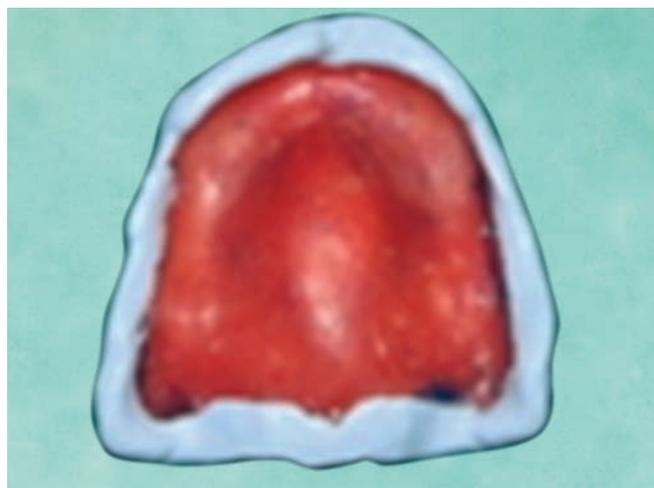
Final impression: is done after 45 minutes of muscle relaxation. The intensity was increased up to 7/sec and single step border molding was carried out using putty consistency of addition silicon. The borders get molded by the twitching of muscles and no manual movements are required.



**Fig. 2:** Placement of electrodes



**Fig. 1:** Primary impressions



**Fig. 3:** Border molding and final impression

After the material was set, the tray was removed. The spacer was scrapped out, relief holes were made and final impression was taken using light body consistency of addition silicon material<sup>18</sup> (Fig. 4).

Facebow record was made and jaw relation was established (Fig. 5). First the cheek plumpers were made and then the teeth arrangement was done.



Fig. 4: Final impressions

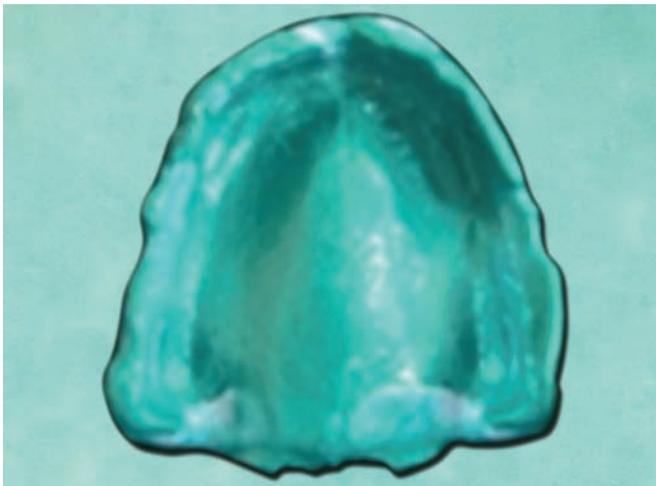


Fig. 5: Facebow record

At the try in stage, in the intraoral view, the plumpers made with wax, attached to the maxillary denture are seen (Fig. 6).

At the try in stage of the denture, in extraoral view, note the depression of the cheeks in the picture without cheek plumpers and the fullness of cheeks in the picture with cheek plumpers (Fig. 7).

Processing of cheek plumpers was carried out in conventional manner: flasking, dewaxing, finishing and polishing. Space for magnets was prepared in the plumpers (Fig. 8).

The trial denture was processed, finished and polished (Fig. 9). Space for magnets was made in the maxillary denture.

Magnets were inserted into the cheek plumpers and the maxillary denture with self-cure acrylic resin. The magnets were covered with a thin layer of self-cure acrylic resin to avoid corrosion. Cheek plumpers are attached to maxillary denture with the help of magnets (Fig. 10). Right and left side markings were made on the cheek plumpers with a fiberoptic pen and a layer of varnish or chloroform and clean acrylic was placed on the marking<sup>19</sup> (Fig. 11).



Fig. 6: Try in denture: intraoral view



Fig. 7: Try-in denture: extraoral view

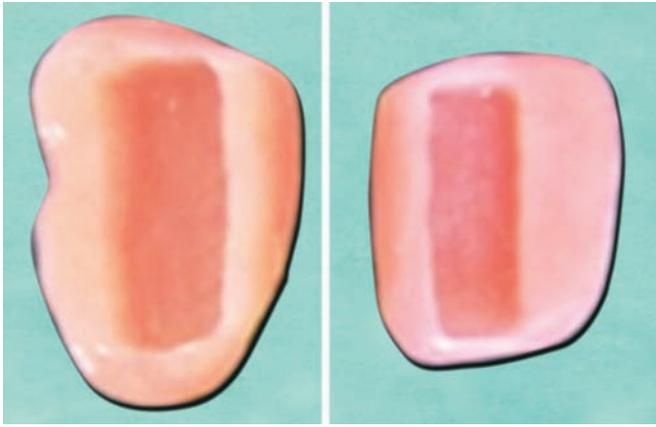


Fig. 8: Processing of cheek plumpers



Fig. 11: Preoperative and postoperative views, notice the fullness of cheek in postoperative view



Fig. 9: Finished denture



Fig. 10: Denture with cheek plumpers (intraoral view)

## CONCLUSION

Proper mold and shade selection of denture teeth is one part of denture esthetics. Correct positioning of anterior teeth for lip support and providing additional support for sunken cheeks at correct vertical dimension in another. An attempt was made here to create dentures that were in harmony and

dignity of the aging gentleman, which would compliment, not eradicate the stigma of aging in him.

Also in the crucial step of border molding where a precise control of the surrounding tissues is needed, TENS technique may be an alternative approach.

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