# INSTITUTIONAL INNOVTION COUNCIL-GOVERNMENT DENTAL COLLEGE &HOSPITAL, NAGPUR

GOVERNMENT DENTAL COLLEGE & HOSPITAL, NAGPUR has its own Institutional Innovation Council (IIC) incubation centre. This was recently established as per the guidelines of Ministry of Education's Innovation Cell.

The aim of the IIC is to encourage the young students to discuss newer ideas and transform and use this platform and ecosystem to help the society.

The objective of the IIC is to identify and reward innovations and share success stories, organize interactions with enterprising industry people and organise *Hakathon* for innovative ideas.

## VISION

"TO CATER THE NEEDS OF STUDENTS AS WELL AS FACULTY ENTREPRENEURS WITH INNOVATIVE IDEAS OF SOCIAL RELEVANCE AND THERE BY DISSEMINATING A CULTURE OF ENTREPRENEURSHIP IN CAMPUS WHICH WILL BOOST OUR EDUCATION SYSTEM AND THERE BY GROWING THE NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT"

## MISSION

"TO DEVELOP A SYSTEM WITH REQUIRED INFRASTRUCTURE THAT CAN ENABLE STUDENTS AND FACULTY TO INNOVATE AND PROTOTYPE THEIR IDEAS WITH INDUSTRIAL STANDARDS AND SUPPORT FROM GOVERNMENT, INDUSTRY AND REPUTED ACADEMIC INSTITUTIONS AROUND THE WORLD AND HELP THEM TO REALIZE THEIR POTENTIALS"

● STUDENTS/FACULTY ASSOCIATED WITH ICS WILL HAVE EXCLUSIVE OPPORTUNITY TO PARTICIPATE IN VARIOUS INNOVATION RELATED INITIATIVES AND COMPETITIONS ORGANIZED FROM INSTITUTION LEVEL TO INTERNATIONAL LEVEL.

● MEET/INTERACT RENOWNED BUSINESS LEADERS AND TOP-NOTCH ACADEMICIANS.

● OPPORTUNITY TO NURTURE AND PROTOTYPE NEW IDEAS.

● MENTORING BY INDUSTRY PROFESSIONALS.

● EXPERIMENT WITH NEW TECHNOLOGIES.

● VISIT NEW PLACES AND SEE NEW CULTURE.

FUNCTIONS OF IIC

● TO CONDUCT VARIOUS INNOVATION AND ENTREPRENEURSHIP-RELATED ACTIVITIES PRESCRIBED BY CENTRAL MIC IN TIME BOUND FASHION.

● IDENTIFY AND REWARD INNOVATIONS AND SHARE SUCCESS STORIES.

● ORGANIZE PERIODIC WORKSHOPS/ SEMINARS/ INTERACTIONS WITH ENTREPRENEURS, INVESTORS, PROFESSIONALS AND CREATE A MENTOR POOL FOR STUDENT INNOVATORS.

● NETWORK WITH PEERS AND NATIONAL ENTREPRENEURSHIP DEVELOPMENT ORGANIZATIONS.

● CREATE AN INSTITUTION’S INNOVATION PORTAL TO HIGHLIGHT INNOVATIVE PROJECTS CARRIED OUT BY THE INSTITUTION'S FACULTY AND STUDENTS.

● ORGANIZE HACKATHONS, IDEA COMPETITION, MINI-CHALLENGES ETC. WITH THE INVOLVEMENT OF INDUSTRIES.

SOME INNOVATIONS IN GDCH, NAGPUR-

1) MODIFIED TWIN-BLOCK AS A MANDIBULAR ADVANCEMENT DEVICE

ORIGINAL ARTICLE AJO-DO

# Three-dimensional upper airway changes with mandibular advancement device in patients with obstructive sleep apnea

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**Introduction:** A mandibular advancement device effectively increases upper airway size in patients with obstructive sleep apnea. Three-dimensional volumetric upper airway changes, exact amounts of change in obstructed upper airways (smallest cross-sectional area), and anteroposterior and transverse changes with mandibular advancement devices are not clear. **Methods:** Thirty-seven patients with obstructive sleep apnea diagnosed with polysomnography were evaluated with the subjective Epworth sleepiness scale, percentage of oxygen saturation, and cone-beam computed tomography. Parameters were airway volume, smallest cross-section area, anteroposterior width, and transverse width of the upper airway. Patients received a mandibular advancement device, a Twin-block appliance that could be titrated with a jackscrew; posttreatment data were collected after 6 months. **Results:** A statistically significant improvement in mean oxygen saturation level was observed, from 87.97% ± 4.43% to 94.89% ± 1.54% ($P$ <0.001). A significant mean increase in airway volume of 2360 ± 2050 $mm^3$ ($P$ <0.001) was observed, from 12140 ± 4773 $mm^3$ to 14500 ± 5114.6 $mm^3$. A stastistically significant mean increase in the smallest cross section of 46.55 ± 31.62 $mm^2$, from 81.95 ± 55.23 $mm^2$ to 128.5 ± 54.78 $mm^2$ was observed. Anteroposterior width increased significantly, from 4.99 ± 1.65 mm to 8.01 ± 2.04 mm. Transverse width increased significantly, from 27.67 ± 8.52 mm to 31.94 ± 8.59 mm. **Conclusions:** Mandibular advancement devices increased the mean upper pharyngeal airway volume in this cohort, and this increase in volume appeared to be related to increased oxygen saturation. (Am J Orthod Dentofacial Orthop 2017;151:941-8)

Obstructive sleep apnea (OSA) is increasingly being recognized as a serious public health problem and is characterized by repetitive, complete or partial closure of the upper airway during sleep, resulting in sleep fragmentation and oxygen desaturation.[1] The key symptoms of OSA are snoring, witnessed apneas, excessive daytime sleepiness, and deficits in neurocognitive function, adversely affecting the quality of life.[1] With the recent interest in sleep apnea, oral appliances of various designs have been proposed and studied.

apnea. Oral appliances used in the management of OSA are mainly the mandibular advancement device, tongue retaining devices, and soft palate lifters.[2] Mandibular advancement devices are the most commonly used oral appliance for the management of OSA.[2] In a 2005 update, the American Academy of Sleep Medicine suggested the use of oral appliances in patients with snoring, mild-to-moderate OSA, or severe OSA only if continuous positive airway pressure has failed.[3]

Several factors appear to contribute to the effective-

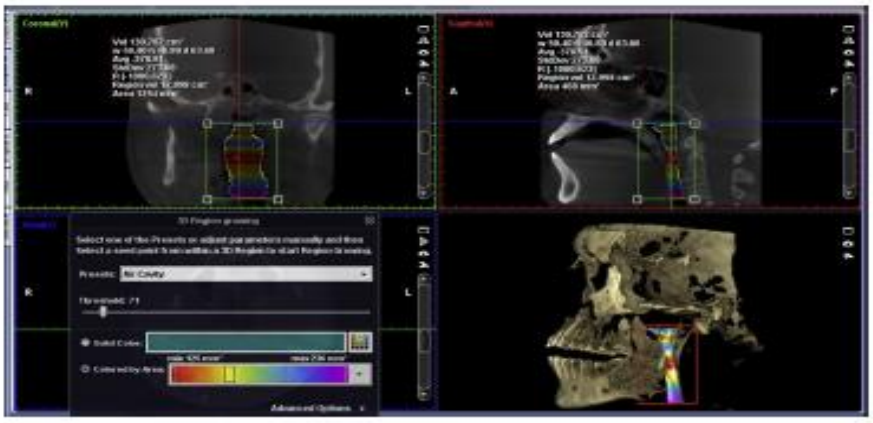

**Fig 2.** Three-dimensional volumetric analysis of the upper airway with a threshold value of 71.

**Fig 3.** Modified Twin-block as a mandibular advancement device.

cross-section area was 81.95 ± 55.23 mm$^2$. The posttreatment smallest cross-section area increased significantly to 128.5 ± 54.78 mm$^2$ ($P$ <0.001; Table II).

A mean pretreatment transverse width of 4.99 ± 1.65 mm was observed. Posttreatment transverse width increased to 8.01 ± 2.04 mm, which was statistically highly significant ($P$ <0.001) with paired $t$ tests. Mean pretreatment transverse width of 27.67 ± 8.52 mm was observed. Posttreatment transverse width increased to 31.94 ± 8.59 mm, which was statistically highly significant ($P$ <0.001) with paired $t$ tests (Table II).

Statistically highly significant increases in volume of airway, smallest cross-section areas, and anteroposterior and transverse dimensions of the smallest cross-section areas were observed with the mandibular advancement

2) Intra-oral twin block appliance with embedded electronic timing device.

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# Correlation of twin-block appliance efficacy and wear durationas assessed with a compliance indicator

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ABSTRACT

*Background:* The aim of this study was to investigate the association between objective wear time and treatment efficacy of a twin block (TB) appliance.
*Methods:* A TB appliance incorporating a compliance indicator was delivered to 44 children in the age group of 11—14 years (25 boys and 19 girls). Participants were instructed to wear the appliance full time and were recalled at 3—4- week intervals. Cephalograms and study models were taken at baseline and after 6 months of appliance therapy.
*Results:* Data from 41 of the 44 participants were analyzed. A wide variation in daily wear time among participants was observed. Based on wear time, they were divided into full time (FT >17 h/d) and part time (PT < 12 h/d) wear groups. Mean wear durations were 20.86 hours in the FT-wear group and 9.55 hours in the PT-wear group. In skeletal changes, the ANB (A point, nasion, B point) angle was reduced by 2.69° in the FT-wear group, and 1.33° in the PT-wear group, and statistically significant increases were seen for the mandibular base measurement (Pg/OLp) in the FT-wear group (2.22mm), compared with those in the PT-wear group (0.44mm). . In dental changes, overjet were reduced by 3.91 mm and 2.0 mm in the FT-wear and PT-wear group, respectively. This difference was statistically significant.
*Conclusions:* Skeletal effects were pronounced in the FT-wear group, and dentoalveolar changes were comparable in the 2 wear groups. The maximum skeletal treatment effect of a TB appliance was found to occur with FT wear over a 6-month treatment period.

a need for a low-cost electronic timing device suitable for tropical countries in the application of wear-time recording of removable acrylic orthodontic appliances. We developed a sensor (electronic timing device) suitable for tropical countries that can sense the wear time by using the principle of infrared proximity detection. This sensor does not rely on temperature change and can be used in many places.

The null hypothesis of the study was that wear time does not affect the treatment efficacy of a TB appliance. Thus, the purpose of our study was to design and use a sensor suitable for tropical countries, to investigate the association between objective wear time and the treatment efficacy of a TB appliance.

## 1. Materials and methods

### 1.1. Sample size calculation

The study was approved by the institutional ethics committee. Epi Info software, and the formula $n = 2\ (Z_\alpha + Z_\beta)^2\ P^2\ /\ d^2$, was used to calculate the sample size. $Z_\alpha$ was 1.96, at an $\alpha$-error of 5%, and $Z_\beta$ was 0.84 at a $\beta$-error of 20%, with the power of the study set at 90%. $P_1$ was 50.5% (the mean percentage of the compliance rate in the functional appliance); $P_2$ was 99% (the ideal percentage of the compliance rate); the significance level was $P < 0.05$; the total sample required was 40 patients. An additional 4 participants were recruited, based on an anticipated 10% attrition rate. Thus, a total of 44 participants were recruited.

### 1.2. Eligibility criteria

Clinical inclusion criteria were as follows: (i) a full-cusp class II

Fig. 1. Intra-oral twin block appliance with embedded electronic timing device.


Fig. 2. Wear time after 1 week (1019×5 minutes = 5095 minutes, i.e., 84.91 hours total, or 12.1 h/d on average).

3) Novel design of mini-plate for fixation of fracture mandible-

ELSEVIER
FULL-TEXT ARTICLE

J Craniomaxillofac Surg. 2019 Jan;47(1):99-105. doi: 10.1016/j.jcms.2018.11.004. Epub 2018 Nov 12.

# An in-vitro evaluation of a novel design of miniplate for fixation of fracture segments in the transition zone of parasymphysis-body region of mandible using finite element analysis

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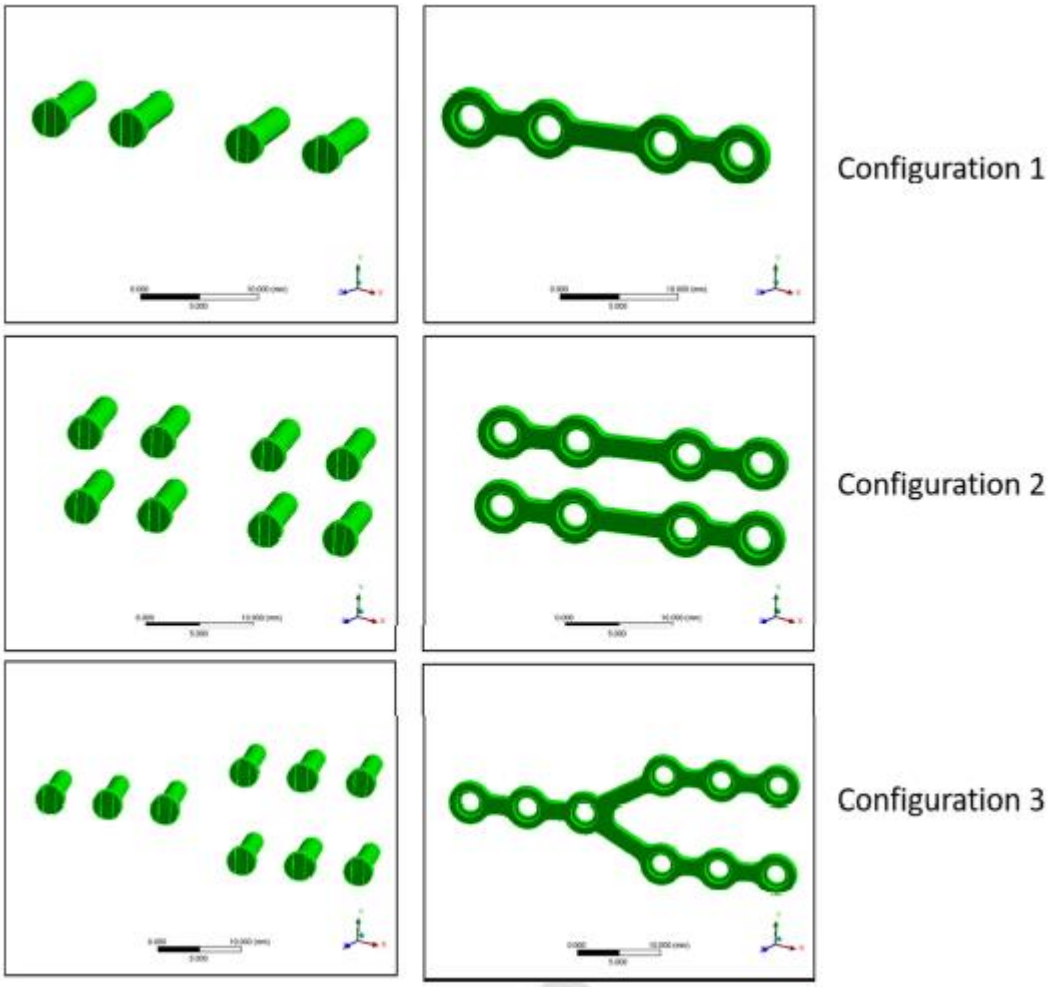
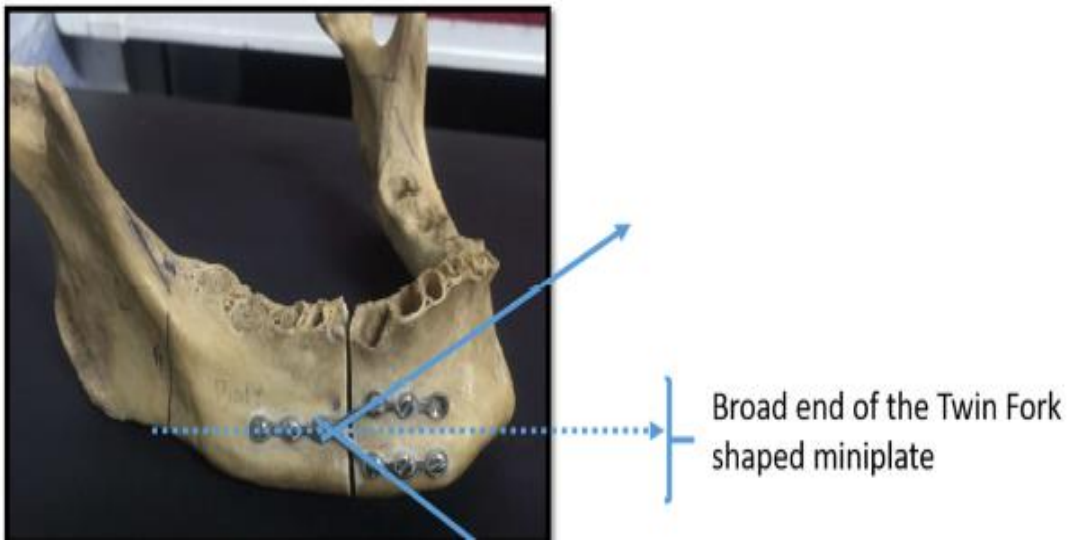
## Abstract

The mandibular parasymphysis and body regions are highly dynamic areas. They are constantly subjected to both occlusal and muscular forces. Fractures at this transition zone of the parasymphysis and body region thus represent a special pattern that creates a dilemma for the surgeons - whether to use one miniplate fixation or two miniplates as per Champy's guidelines. Mental nerve paresthesia is a very common complication due to dissection and stretching of the mental nerve in this region. Hence, an in-vitro research study of a novel twin fork design of miniplate is performed, which





4) Solar energy driven Mobile Dental Van

## PROTOTYPE