

# Comparative Evaluation Of Treatment Effect Between Two Fixed Functional Appliances For Correction Of Class II Malocclusion

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## ABSTRACT

**Background:** The present study was conducted to **compare** Power Scope and Forsus fatigue resistant device in management of class II malocclusion patients.

**Materials & Methods:** Group I patients were treated with Power Scope device and group II with Forsus fatigue resistant device.

**Results:** Group I had 8 males and 16 females and group II had 10 males and 14 females. The mean SNA was 81.2 in group I and 80.3 in group II, SNB was 74.5 in group I and 73.1 in group II, ANB was 5.1 in group I and 6.0 in group II, GoGN- SN was 29.0 in group I and 31.8 in group II, IMPA was 103.2 in group I and 102.8 in group II, J ratio % was 67.2 in group I and 64.5 in group II and U1-SN was 105.4 in group I and 103.6 in group II. The mean time taken for appliance insertion in group I was 624.1 seconds and in group II was 1019.3 seconds.

**Conclusion:** Both Power Scope and Forsus were effective in management of class II malocclusion patients.

**Key words:** Class II malocclusion, Forsus, Power Scope

## 1. INTRODUCTION

Patients reporting with Class II malocclusion form a chief part of orthodontic abnormalities. Studies suggested that in class II malocclusion mandibular retrognathia is the central reason, rather than maxillary prognathism being accountable for it (Mcnamara; 1981). For Class II patients in whom the mandible is retrognathic, the ultimate method of correction is to target the basis and try to modify the volume or direction of growth in that jaw (Nelson et al; 1993).

In such patients, for stimulation of mandibular growth by forward positioning of the mandible, fixed or removable functional appliances are applied. An extensive range of

functional appliances intended to stimulate mandibular growth by forward posturing of the mandible is accessible to correct class II skeletal and occlusal disharmony (**Patel et al; 2002**).

The stimulation of mandibular growth, distal movement of the upper dentition, and mesial movement of the lower dentition adds to the correction of Class II malocclusion with the practice of fixed functional appliances (**Cozza et al; 2006**).

The Power Scope is a new addition to the orthodontist's armamentarium. It is brought as a one size-fits-all appliance, preassembled with attachment nuts for rapid and convenient chairside application (**Pancherz; 1979**). The Forsus fatigue resistant device is fixed functional devices frequently used by orthodontists. The appliance entails of a push rod that supplements into a telescoping cylinder and is attached to the mandibular arch wire distal to either the canine or first premolar bracket (**Vogt; 2006**).

The present study was conducted to compare Power Scope and Forsus fatigue resistant device in management of class II malocclusion patients.

## 2. MATERIALS & METHODS

This study was conducted in the department of Orthodontics from January 2019 to June 2020. It comprised of 48 patients of class II malocclusion of both genders. All were informed regarding the study and their consent was obtained. Ethical clearance (**Ethical approval code- BIDS/DEAN/2019/1236**) was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 24 each. Group I patients were treated with PowerScope and group II with Forsus fatigue resistant device. Lateral cephalometric radiographs were taken before commencing treatment with fixed functional appliance therapy (T1), immediately (1–3 days) before settlement of the fixed functional appliance (T2), and after elimination of the fixed functional appliance (T3). The pitchfork analysis was used for assessment of skeletal and dentoalveolar fluctuations that contributed to the Class II correction. Result were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

## 3. RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Appliance	Power Scope device	Forsus fatigue resistant device
Male: Female	8:16	10:14

Table I shows that group I patients were treated with Power Scope device and group II with Forsus fatigue resistant device. Group I had 8 males and 16 females and group II had 10 males and 14 females.

Table II Comparison of parameters in both groups

Parameters	Group I	Group II	P value
SNA	81.2	80.3	0.09
SNB	74.5	73.1	0.12
ANB	5.1	6.0	0.17
GoGN- SN	29.0	31.8	0.13
IMPA	103.2	102.8	0.92
J ratio%	67.2	64.5	0.06

U1-SN	105.4	103.6	0.92
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Table II, graph I shows that mean SNA was 81.2 and 80.3 in group I and group II respectively, SNB was 74.5 and 73.1 in group I and group II respectively, ANB was 5.1 and 6.0 in group I and group II respectively, GoGN- SN was 29.0 and 31.8 in group I and group II respectively, IMPA was 103.2 and 102.8 in group I and group II respectively, J ratio % was 67.2 and 64.5 in group I and group II respectively and U1-SN was 105.4 and 103.6 in group I and group II respectively. The difference was non- significant ( $P > 0.05$ ).

Graph I Comparison of parameters in both groups

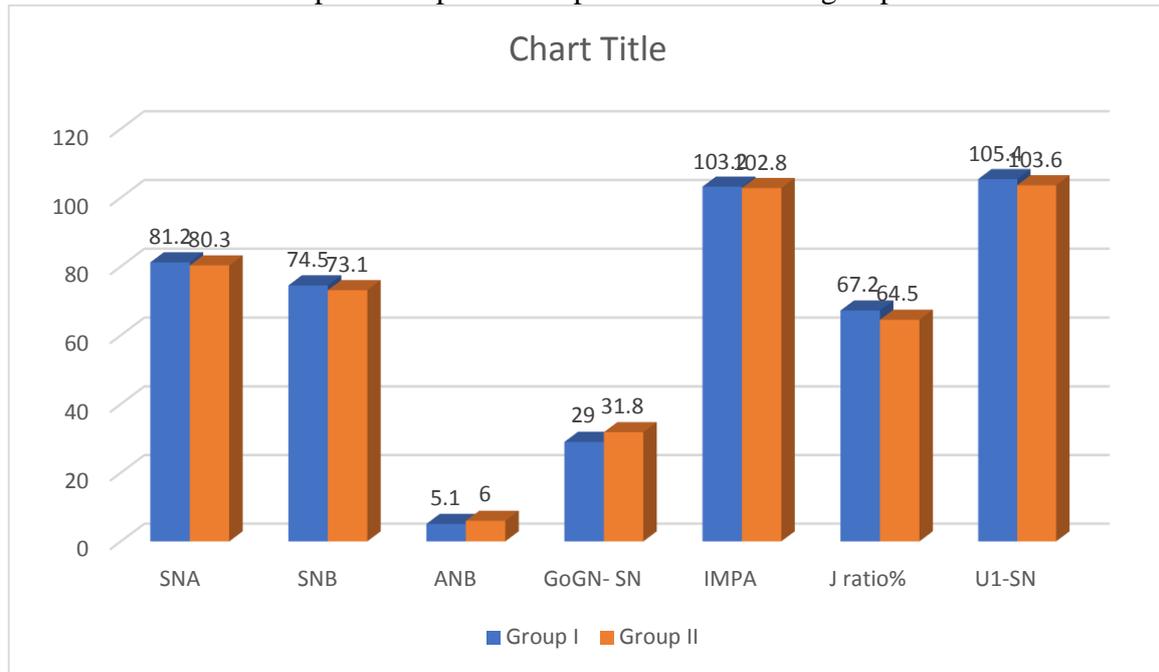


Table III Comparison of time taken for appliance insertion in both groups

Groups	Mean	P value
Group I	624.1	0.001
Group II	1019.3	

Table III shows that mean time taken for appliance insertion in group I was 624.1 seconds and in group II was 1019.3 seconds. The difference was significant ( $P < 0.05$ ).

#### 4. DISCUSSION

Proclination of upper incisors and/or retroinclination of the lower incisors by a habit or the soft tissues can result in an increased overjet in any type of skeletal pattern (Ross et al; 2007). In class II division 1, the lips of the parents are customarily incompetent and they attempt to compensate it via circumoral muscular activity, rolling the lower lip behind the upper incisors, or moving the tongue forward between the incisors, or a combination of all these items. (Sood et al; 2011)

Finger-sucking or other oral habits may also result into the development of this malocclusion, typically following disparities of the buccinator muscles and tongue force, and narrowing the maxillary arch (Bowman et al; 2011). The present study was conducted to compared PowerScope and Forsus fatigue resistant device in management of class II malocclusion patients.

In our study, group I patients were treated with Power Scope device and group II with Forsus fatigue resistant device. Group I had 8 males and 16 females and group II had 10 males and 14 females. Arora et al evaluated and compared the effects of Power Scope and Forsus in the management of 28 Class II division 1 malocclusion patients designated for treatment with fixed functional appliances were randomized and divided equally (n = 14) among Power Scope and Forsus groups. Skeletal and dentoalveolar effects of Power Scope and Forsus were compared. A significantly greater mesial mandibular movement and improvement in sagittal skeletal relation were found in the Forsus patients (P .05). The forward movement of the mandibular molar and incisors were greater in the Power Scope patients (2.3 mm and 2.80 mm) than in the Forsus patients (1.9 mm and 2.38 mm). Both Power Scope and Forsus are effective in correcting Class II malocclusion. The percentage of dentoalveolar effects in correcting Class II malocclusion is more for Power Scope when compared with Forsus. Patient comfort was similar with both appliances (**Arora et al; 2018**).

We found that the mean SNA was 81.2 and 80.3 in group I and group II respectively, SNB was 74.5 and 73.1 in group I and group II respectively, ANB was 5.1 and 6.0 in group I and group II respectively, GoGN- SN was 29.0 and 31.8 in group I and group II respectively, IMPA was 103.2 and 102.8 in group I and group II respectively, J ratio % was 67.2 and 64.5 in group I and group II respectively and U1-SN was 105.4 and 103.6 in group I and group II respectively. Fixed functional appliances were introduced first by Emil Herbst to overcome the collaboration hindrance of removable appliances. The important differences between removable and fixed appliances are different working hours (intermittent vs. continuous), and also ideal treatment timing (before puberty growth vs. at or after puberty spurt) and direction of further growth (**Johnston; 1996**).

In this study, mean time taken for appliance insertion in group I was 624.1 seconds and in group II was 1019.3 seconds. The dentoalveolar effects on the lower dental arch with both appliances were mesial movement of the lower molars and proclination of the lower incisors. These findings are in accordance with those reported in various other studies of fixed functional appliances and were a result of the downward and forward application of force on the mandibular dentition. (**Heinig; 2001**)

The limitation of the study is small sample size.

## 5. CONCLUSION

Authors found that both Power Scope and Forsus were effective in management of class II malocclusion patients. Nonetheless, time taken for appliance insertion in Power Scope group was reduced than Forsus.

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### **Authors' contribution:**

**Dr Anju Jha -:** Research conceptualization and manuscript writing.

**Dr Richashree:** Study design and data analysis, manuscript writing.

**Dr Sovendu Jha:** Study design and Manuscript writing.

**Dr Shalini Singh:** Study design Manuscript writing.

**Dr Anuradha Pandey:** Study design, statistical analysis and Manuscript writing

**Dr Priyanka Mukul:** Study design, statistical analysis and Manuscript writing.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Informed Consent:** Appropriate oral and signed consent was taken from the patient before writing this research paper

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**Data and materials availability:** All data associated with this study are present in the paper

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