

## Sleeve Push Technique: A Novel Method of Space Gaining

### Abstract

Space gaining is frequently required in orthodontics. Multiple loops were initially used for space gaining and alignment. The most common used mechanics for space gaining is the use of nickel–titanium open coil springs. The disadvantage of nickel–titanium coil spring is that they cannot be used until the arches are well aligned to receive the stiffer stainless steel wires. Therefore, a new method of gaining space during initial alignment and leveling has been developed and named as sleeve push technique (SPT). The nickel–titanium wires, i.e. 0.012 inches and 0.014 inches along with archwire sleeve (protective tubing) can be used in a modified way to gain space along with alignment. This method helps in gaining space right from day 1 of treatment. The archwire sleeve and nickel–titanium wire in this new SPT act as a mutually synergistic combination and provide the orthodontist with a completely new technique for space opening.

**Keywords:** Archwire sleeve, nickel–titanium wire, space gaining

### Introduction

Space gaining/opening is one of the most common procedures in orthodontics. Space gaining is generally required in malocclusion presenting with blocked out teeth both in maxillary and mandibular arch and mesially tipped molars. Various mechanics have been used for space gaining in the arch, for example, multiple loops, open coil springs, molar uprighting springs,<sup>[1-4]</sup> and orthodontic separators for mild space creation.<sup>[5]</sup> The most common used mechanics for space opening/gaining is the use of nickel–titanium open/compression coil springs.<sup>[2]</sup> It provides a gentle force for opening space. However, the main disadvantage of nickel–titanium coil springs is that they cannot be used until the teeth in the arches are well aligned to receive the stiffer stainless steel wires. Thus, presently, space gaining with nickel–titanium open/compression coil springs is possible only after a few months of alignment and leveling. This factor sometimes becomes a testing time with patients demanding quick results. This has necessitated the development of new sleeve push technique (SPT) for space gaining.

### Sleeve push technique

The technique involves the use of archwire sleeve which is a rubber-based tubing (clear

archwire protective tubing, 0.018", G and H Orthodontics, IN, USA) usually used to protect soft tissue from trauma in long extension archwire.<sup>[6]</sup> The nickel–titanium wires, i.e. 0.012 and 0.014 inches can be used in a modified way to gain space along with alignment. This method helps in gaining space right from day 1 of treatment. This archwire sleeve provides resistance against the spring back and shape memory property of the nickel–titanium archwire, and hence, force generated by the resistance of archwire sleeve is utilized for opening the space. The space is gained by mesio-distal and labio-lingual movement of the teeth.

### Procedure

In this new mechanics, the elastic archwire sleeve with a length longer than the interbracket distance helps in formation of a loop in the nickel–titanium wire which tends to push the teeth utilizing inherent resiliency of the wire. The sleeve on the archwire of length 1.5 to 3 times of the interbracket distance between the teeth where space is to be gained is used [Figure 1a-f]. The wire ligated should be longer than the dental arch (distal-most teeth bonded) of patient. Thus, the extra length of the working wire forms a loop when ligated on the mesial and distal tooth. The loop formed exerts gentle pressure on

**Sanjeev Verma,  
Nameksh  
Raj Bhupali,  
Deepak Kumar  
Gupta<sup>1</sup>,  
Sombir Singh,  
Satinder Pal Singh**

*Department of Orthodontics and Dentofacial Orthopaedics, OHSC, PGIMER, <sup>1</sup>Department of Orthodontics and Dentofacial Orthopaedics, HS Judge Institute of Dental Sciences, Panjab University, Chandigarh, India*

#### Address for correspondence:

*Dr. Satinder Pal Singh,  
Department of Orthodontics and Dentofacial Orthopaedics, OHSC, PGIMER, Chandigarh, India.  
E-mail: drsp Singh\_chd@yahoo.com*

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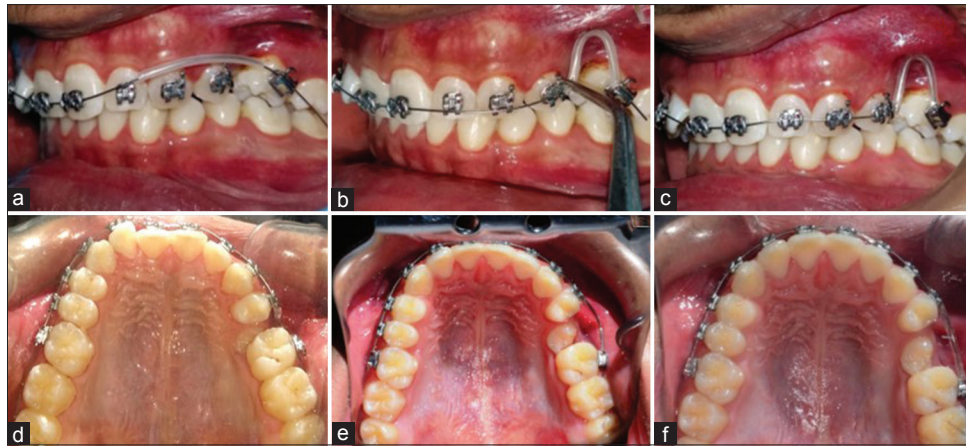


Figure 1: (a-f) Clinical representation of ligation for sleeve push technique (methodology) and distal tipping of permanent molar

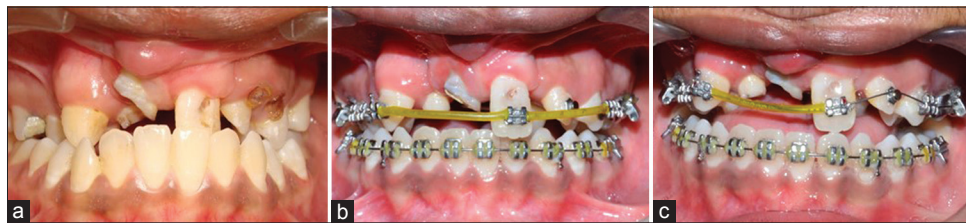


Figure 2: (a) Maxillary left central incisor in anterior crossbite. (b) Archwire sleeve between incisor and canine led to incisor proclination. (c) Bilateral sleeves mesial and distal to the central incisor helped to attain positive overjet

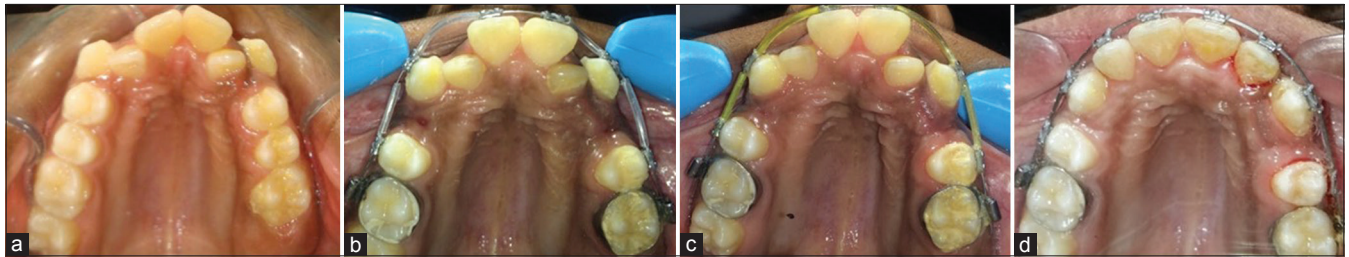


Figure 3: (a) Palatally placed upper lateral incisors in the crowded maxillary arch. (b) Activated archwire sleeve between incisor and canine bilaterally. (c) Space gained using after 4 months of treatment. (d) Lateral incisors in proper alignment



Figure 4: (a-c) Space gained in the maxillary arch having unerupted teeth



Figure 5: (a-c) Space gained in crowded mandibular arch with lingually displaced right mandibular canine

the mesial and distal tooth to gain space without hurting the lip or cheek mucosa as wire is covered with elastic sleeve. After the ligation of the wire, the patient is reappointed after 30–40 days.

### Applications of sleeve push technique

The technique has been tried in different cases in maxillary and mandibular segments. The archwire is activated in subsequent visits to gain required. The effectiveness and efficiency of SPT is illustrated in following examples.

#### Proclination of maxillary incisors for overjet correction

Correction of reduced overjet can be achieved through proclination of the upper anterior teeth. Thrust on the anterior teeth because of archwire sleeve in Nickel Titanium wire causes the teeth to move in forward in the sagittal direction [Figure 2a-c]. Hence, this technique has the similar effects that of the stoppered archwire which is given after alignment and leveling in the stainless steel wire.

#### Space gaining in the crowded arches

##### *In extraction cases*

SPT is helpful in space creation in the crowded arches during the early treatment. The space was gained with this technique for the palatally placed upper lateral incisors after extraction of 14 and 24. The activation can be done after 40 days using a longer sleeve than the original one which flattens out at the first visit. The space was successfully gained along with alignment in the first 4 months [Figure 3a-d].

##### *Space gaining for unerupted teeth*

Out of various etiologies behind the noneruption of teeth, prolonged retention of deciduous teeth and lack of space are considered as potential etiological factors.<sup>[7]</sup> There was crowding in maxillary arch. SPT was used to successfully gain space in maxillary arch for alignment and also for eruption of the canines. The maxillary left permanent canine erupted after space gaining [Figure 4a-c].

##### *In nonextraction cases*

Figure 5 shows crowding in the lower arch with lingually displaced canine on the right side. The pre- and post-treatment photographs show the successful gaining of space in 1 month 15 days. Canine was then bonded and complete arch alignment was achieved in 2 months and 15 days [Figure 5a-c].

#### Distal tipping of molars

The distal movement of a mesially tipped maxillary left molar was attempted after the extraction of third molar with the help of SPT. After 2 activations over a period of 2 months, maxillary right first molar was successfully distally tipped and space was gained for unerupted second

premolar. No model or cephalometric analysis was done to calculate distal movement, but the molar relation shows transition from a Class II to end on and further to Class I relation, thus confirming the distal movement of tooth [Figure 1a-f]. Although the first premolar shows labial movement (slight expansion), this can be corrected on sequential rigid wires.

### Discussion

Comprehensive orthodontic treatment broadly comprises three treatment phases: alignment and leveling, molar relation correction, and finishing.<sup>[8]</sup> Space gaining is an integral part during early phase of comprehensive orthodontic treatment. The methods of space gaining at present require the stainless steel wire ligated in the bracket slots. The use of this technique overcomes this requirement and provides a good alternative for space gaining. SPT is a unique and novel method of space gaining which can be used in the initial part of the treatment right from day 1 and hence helpful in the reduction of treatment timing. The gain in space occurs by expansion and proclination in anterior segment in nonextraction cases. In extraction cases, it may occur by combination of distal movement and expansion/proclination. The forces applied are very light without the requirement of special armamentarium. It is cost effective as it does not require nickel–titanium springs.

#### Limitations

1. It should not be used in cases where expansion and proclination of anterior teeth is not required
2. Sometimes, the loop formed may be irritating to the patient.

### Conclusion

Interestingly, the archwire sleeve and nickel–titanium wire in this new technique act as a mutually synergistic combination and provide the orthodontist with a completely new technique for space opening.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

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