

The Kansal Separator: In Search of "A Better Mouse Trap"*

Arthur Wilcock¹, Sudhanshu Kansal², Gurkeerat Singh³, Pradeep Raghav⁴, Piush Kumar⁵, Arun Kumar⁶

ABSTRACT

Separation of teeth for the purpose of banding is a common orthodontic procedure. A variety of separators are available in the market all with their different advantages and disadvantages. Kansal separator has proved to be an invaluable aid in achieving the separation of teeth with a minimal inherent disadvantage. The authors now describe the separator and the possible adjustments in the spring assembly to enhance its usage in clinical scenario. Also explained is the placement and removal of the Kansal separator.

Keywords: Kansal Separator, Molar Separation.

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INTRODUCTION

In the past, orthodontic separators have been utilized to create the necessary separation between adjacent teeth. These separators include elastomeric modules, plastic separators, twisted brass wire, Kesling spring and nickel titanium alloy (NEET) springs. Though the above devices can separate teeth for placement of orthodontic bands, all have certain inherent disadvantages in them.

1. Each tooth requires two separators for adequate separation, one on mesial and another on distal aspect wherein if even one separator is dislodged, banding procedure is not possible.
2. There is no provision to prevent the premature dislodgement of separators and loose separators can cause severe gingival inflammation, bleeding gums, pain and swelling. Premature dislodgement of separators leads to unproductive visits and wastage of precious time and energy, of not only the patients but also the orthodontist.

THE SOLUTION

To counteract the problems of existing separators, an innova-



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Figure 1: Kansal Separator

This separator acts like a '2 in 1', Self-secured Orthodontic Spring separator and it is called as the 'Kansal Separator' (Fig. 1).

The Prefabricated Kansal Separators are made from 0.016 inch AJ Wilcock SS wire which are manufactured using CNC precision spring making, automated Japanese machine ITAYA, under the expert guidance of the 'Pioneer in Orthodontic wires'; Arthur J. Wilcock, (ARMIT Mech, Elect).

tive proprietary orthodontic device, which works on a spring mechanism, is designed. Here a single device separates both mesial and distal aspect of tooth simultaneously, adequately yet independently ('2 in

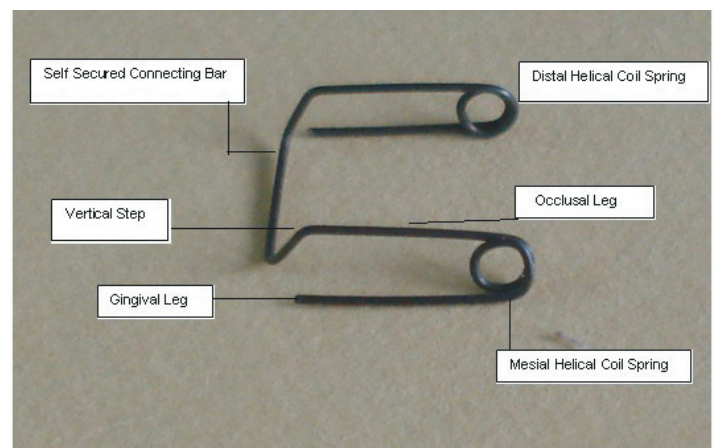


Figure 2: Parts of the 'Kansal Separator'.

Parts of Kansal Separator (Fig. 2).

1. GINGIVAL LEG

It runs from buccal to lingual/palatal aspect of the tooth and is

in close proximity with gingiva. It is inserted under the interproximal contact area, one inserted in the distal contact area and other in the mesial contact area.

2. HELICAL COIL SPRING

The helical coil spring is the extension of gingival leg and rests in the buccal region, one in the mesial and other in the distal aspect of the tooth to be separated

3. OCCLUSAL LEG

It is the extension of helical coil spring and is in close proximity of occlusal surface of the tooth. It runs over the interproximal contact area, one in the distal and other in the mesial aspect of the tooth. The occlusal leg is always longer than gingival leg.

4. VERTICAL STEP

A vertical step is given at the end of the occlusal leg. The angle between occlusal leg and the vertical step is slightly obtuse. The vertical step ends below the maximum contour of lingual/ palatal aspect of the tooth. There is a distal vertical step and a mesial vertical step.

5. SELF-SECURED CONNECTING BAR

The mesial and distal vertical steps are connected by a "Self-Secured Connecting Bar" such that the wire runs horizontally below the maximum contour of tooth and its length is approximately the mesio-distal width of lingual/palatal aspect of the tooth. The self-secured connecting bar prevents the separator from dislodgement.

Kansal Separator can be broadly divided in 3 sections (Fig.3):-

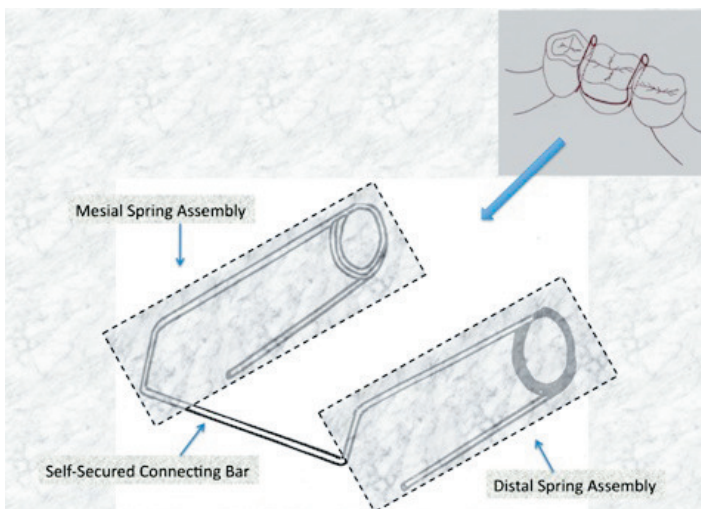


Figure.3: Sections of Kansal Separator.

A) MESIAL SPRING ASSEMBLY

It consists of Occlusal Leg, Helical coil spring, Gingival Leg and a vertical step. The mesial spring assembly separates the mesial aspect of tooth.

B) DISTAL SPRING ASSEMBLY

It is same as a mesial spring assembly except that it separates the distal aspect of tooth.

C) SELF-SECURED CONNECTING BAR:

It joins the mesial and distal spring assembly and prevents the dislodgement of the separator.

SIZE SELECTION

It is almost same as selecting an orthodontic band

- Indirect method:** By checking the size on the study models
- Direct Method :** By checking the size directly on patients mouth
- Visual Evaluation :** Size can be assessed by visually seeing the tooth size

Adjustments in Kansal Separator (Fig. 4).

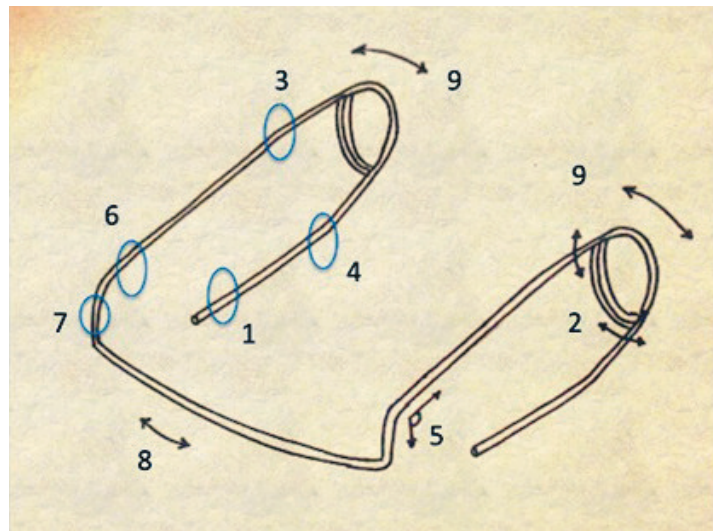


Figure. 4: Sections of Kansal Separator.

The Kansal Separator is Dynamic in Nature and allows various adjustments according to:

- Variation in tooth anatomy
- Amount of activation or force required for adequate separation needed

Unlike orthodontic bands where a huge armamentarium is required, Kansal separator is limited to 3 different sizes only: Small, Medium and Large

Small/medium size separators can largely be used in females and medium/large prototype can be used in case of males.

The size may vary on racial variation e.g. For Native American population; medium and large size may be more used as com-

pared to Indians where small and medium size is more common.

THE VARIOUS ADJUSTMENTS ARE AS FOLLOWS

Adjustment 1: The length of gingival leg can be decreased by cutting the excess length.

Adjustment 2: Bringing the gingival leg and occlusal leg closer to each other can increase the activation of the separator. Taking of gingival and occlusal leg away from each other can decrease the activation.

Adjustment 3: The length of occlusal leg can be shortened by slightly bending it in gingival direction at a distance of 1-2 mm away from the helical coil spring. This also increases the activation of the separator.

Adjustment 4: The length of gingival leg can be shortened by slightly bending it in occlusal direction at a distance of 1-2 mm away from the helical coil spring. This also increases the activation of the separator.

Adjustment 5: The angle between occlusal leg and vertical step can be adjusted easily according to tooth anatomy. A further fine bending adjustment may be needed to suit the anatomy of the tooth and to fully utilize the clamping action of the spring.

Adjustment 6: If the junction of occlusal leg and vertical step is slightly occlusal, it can cause occlusal interference. A slight bend in gingival direction is given just behind the junction of the occlusal leg and vertical step to eliminate occlusal interference.

Adjustment 7: To decrease the length of vertical step, a slight bend can be given in the middle of the vertical step. To increase the length of vertical step a slight bend in gingival direction is given just behind the junction of the occlusal leg and vertical step.

Adjustment 8: To decrease the length of the self-secured connecting bar, its contour can be slightly increased.

Adjustment 9: If the tooth is convergent bucco-lingually, the separator can be adjusted by moving the mesial spring assembly and distal spring assembly, apart from each other. If the tooth is divergent bucco-lingually then the mesial and distal spring assembly are brought closer to each other.

Insertion of Kansal separator 1: (Fig .5, 6, 7, 8, 9)



Figure.5: Insertion of Kansal separator (step 1).



Figure.6: Insertion of Kansal separator (step 2).



Figure.7: Insertion of Kansal separator (step 3).



Figure.8: Inserted Kansal Separator (Palatal View).



Figure. 9: Inserted Kansal Separator (Buccal View).

1. While holding the distal helical coil spring using a light arch wire plier (no.139), one side of gingival leg is inserted below the contact area on distal aspect of tooth. Any other pliers can also be used as per the convenience of orthodontist.

- Then the contra-lateral gingival leg is inserted below the contact area on the mesial aspect of the tooth such that the self-secured connecting bar lies on the occlusal surface.
- The self-secured connecting bar is then lifted and dragged in a lingual/palatal direction till it locks itself on the lingual / palatal aspect of the tooth. The helical spring coils are in close contact with the buccal (mesial and distal) aspect of the tooth.

REMOVAL OF KANSAL SEPARATOR

- The removal is exactly the opposite of insertion procedure.
- The self-secured connecting bar is lifted and dragged from the lingual / palatal aspect to a more buccal direction such that it lies on the occlusal surface.
- This is followed by pulling the helical coil springs of the mesial and then distal assembly buccally and disengaging the self-secured connecting bar.

CONCLUSION

The aim of innovation Kansal Separator [1-5] was to address the inherent problems of existing separators and prove to be a "Better Mouse Trap".

FOOTNOTE

- * The Kansal Separator was Selected as Top 50 Innovations in India by 'DST- Lockheed Martin India Innovation Growth Programme 2012',[5]; by distinguished panelist from Department of Science & Technology, India; IC2 Institute, University of Texas, USA; Lockheed Martin, USA; IUSSTF, USA & FICCI, India. The IC2 Institute, University of Texas, Austin prepared a Technology assessment report called 'Quicklook TM Market Validation Report' which stated that "the innovation appears to have a solid potential due to its unique design".

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AUTHORS

- Arthur Wilcock**
ARMIT, Mech, Elect
Consultant , A.J Wilcock Pvt Ltd., UK
Email: wilcockhome@dbmail.com



- Dr. Sudhanshu Kansal**
(Innovator and Corresponding author)
Address: E-9/23 Vasant Vihar,
New Delhi - 110057, India
Email : dr_rupie@yahoo.co.in



- Dr. Gurkeerat Singh**
B.D.S. M.D.S.
Professor and Head,
Dept. Of Orthodontics &
Dentofacial Orthopaedics,
Sudha Rustogi Dental College.
Address: B-32 ,F.F, South Extension-1,
New Delhi- 49, India
Email: gurkeerats@hotmail.com



- Dr. Pradeep Raghav**
B.D.S. M.D.S.
Professor and Head,
Dept. Of Orthodontics &
Dentofacial Orthopaedics,
Subharti Dental College.
Address: Subharti University,
Delhi Meerut Road, Meerut. India- 250006
Email: drpradeepraghav@gmail.com



- Dr. Piush Kumar**
B.D.S. M.D.S.
Associate Prof,
Dept. Of Orthodontics & Dentofacial
Orthopaedics,
I.T.S.-CDSR.
Address: C-803 Doctors Park Sector-5 Vasundhara
Ghaziabad
Uttar Pradesh, India - 201012
Email: kumarpiush@yahoo.co.uk



- Prof. Arun Kumar**
Professor, Dept. of Physics
IIT, Delhi, India
Email: akumar@physics.iitd.ac.in

