Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 VOL12, ISSUE07, 2021

SPEED APPLIANCE - AN OVERVIEW

Dr Sameer Narkhede[1], Dr Aarti Sethia[2], Dr Pranita Jhadav[3], Dr Tanushree Bagree[4], Dr Shreyans Dalvi[5], Dr Shristi Nadar[6]

[1.] Professor & Head, Department Of Orthodontics & Orthopaedics, D.Y.Patil University, School of Dentistry, Navi Mumbai

[2.] Lecturer, Department Of Orthodontics & Orthopaedics, D.Y.Patil University, School of Dentistry, Navi Mumbai

[3.] Lecturer, Department Of Orthodontics & Orthopaedics, D.Y.Patil University, School of Dentistry, Navi Mumbai

[4,5,6.] Post graduate student, Department Of Orthodontics & Orthopaedics, D.Y.Patil, University, School of Dentistry, Navi Mumbai

ABSTRACT

The development of better orthodontic materials and appliance design made significant advances forward during the 1970s. Significant advances in the art and science of clinical orthodontics during the 1970s include the development of preadjusted appliances, the advent of considerably improved arch wires, and the progress of various bonding procedures. These are now making it possible for orthodontists to provide patients with better treatment outcomes with fewer uncomfortable and time-consuming procedures than ever before. In the last 25 years, the SPEED design has undergone extensive improvement. Improvements include the insertion of a super elastic nickel titanium spring clip, a "labial window" to facilitate opening the spring clip, and a horizontal auxiliary slot in the bracket body to facilitate segmental archwire mechanics. Although almost any archwire can be used with the SPEED bracket, some archwires have been created to maximise SPEED's natural advantages. These include Hills Dual-Geometry archwires, SPEED archwires, and Supercable, a seven-stranded coaxial nickel titanium archwire.

INTRODUCTION

Revolution is not an event, it's a process.

Developments in treatment philosophy, mechanics, and appliances leads to a better understanding of orthodontic tooth movement. In the market, there are lots of orthodontic companies. Each company develops its own bracket system with particular guidelines, medical theories, and operational details. However, one aspect of all brackets, namely the ligatures ties used to secure the arch wires in the bracket slot, is the same.[1] Brackets with a locking mechanism (such a ring, spring, or door mechanism) that keeps the arch wire in the bracket slot are referred to as "self-ligating brackets" (SL brackets). [2]

Early in the 1970s, Dr G. Herbert Hanson created the SPEED appliance. Since it became commercially accessible in 1977, the SPEED appliance has been used in clinical settings. It has an active spring clip and is a miniature self-ligating bracket that comes in 0.018 and 0.022

ISSN: 0975-3583, 0976-2833 VOL12, ISSUE07, 2021

slot sizes. The appliance is designated by the acronym SPEED. The words SPRING-LOADED, PRECISION, EDGEWISE, ENERGY, and DELIVERY, all of which characterise design attributes, were combined to create the name.

HISTORY

Since the beginning of orthodontic therapy, several ligatures have been employed. The major purpose of the ligatures is to keep the archwire in the bracket slot. Two main types of ligatures are steel ligature ties and elastomeric ties. Steel ligatures are superior as it provides with full bracket engagement of the arch wire, secure and robust, show decreased friction, retain the shape and strength delivering low continuous force, easier and quicker to place, does not interfere in the attachment of elastic chain, helps in maintaining good oral hygiene and is comfortable for the patient. Limitations of the steel ligature ties are that it gives poor control of tooth movement as it does not provide full archwire engagement, gets displaced, Oral hygiene is potentially hindered and increases the chairside time.
Another significant development in orthodontics was the advent of elastomeric ligatures in the 1970s, which completely superseded steel ligatures. These can be used in chains to cover gaps within the arch or stop them from opening up because they are quicker and simpler to place. These have the drawback that the force degrades over time, leading to poor tooth control and easy displacement.

Dr Jacob Stolzenberg, a pioneer in New York orthodontics, created the Russell attachment, the first self-ligating bracket, in the early 1930s. In the face of this bracket, there was a circular, threaded aperture that a flat-head screw was tightly placed in. Arch wire modifications were quick and easy for the orthodontist.[3] Early passive, ligature-free methods were created by Boyd and Ford (1933), but they were never extensively adopted.[1] The Edgelok bracket, designed in 1971 by Dr Jim Wildman of Eugene, Oregon, had a rounded body and a rigid labial sliding top. The slide was moved occlusally for the installation of the arch wire using a specialised opening tool. The first to experience any kind of commercial success was this bracket system. They were never widely used because of drawbacks like poor rotational control, bulkiness, and some difficulty opening and closing the slide.[2] Dr Erwin Pletcher's self-ligating Activa bracket provided another option in 1986. The rigid, curving arm of the Activa bracket rotated occlusogingivally around the bracket's cylindrical body. Finger pressure alone was sufficient to move the arm into a "slot-open" or "slot closed" state. Then Heiser's Time bracket and Wildman's TwinLock bracket were given in 1998.

SPEED system is the new paradigm, and it is unique in concept and design. SPEED enables unsurpassed clinical and treatment efficiency while boosting patient acceptance, transcending the constraints imposed by out-of-date designs. It does not require ligatures since it secures the archwire with a tough, super-elastic Spring Clip.

ISSN: 0975-3583, 0976-2833 VOL12, ISSUE07, 2021

SPEED APPLIANCE MECHANICS

A versatile orthodontic edgewise mechanism is the SPEED Appliance. It can be combined with different bracket designs, but when utilised as a uniform orthodontic system, it works best. Utilizing threshold forces has numerous advantages, including improved patient comfort. Whatever mechanisms are employed, it is advised that they be combined with low "Threshold Forces"[6]. In order to overcome the specified tooth resistance without going above capillary blood pressure, certain amount pressure is chosen. These incredibly light forces typically range in weight from 30 to 80 gm and offer maximal mobility with the least amount of strain on anchorage.

Micro-retentive mesh base- no specific bonding procedure or adhesive needed, miniaturisation improves base fit, increases bond strength, shapes and contours that reflect tooth anatomy, and a coarse mesh that assures adhesive penetration.

The speed mushroom hook- Any type of intra-oral elastomerics can be securely held in place by this hook's unusual shape and easy grab. In addition to providing SPEED's unmatched ease of cleanliness, its smaller size and curved design nearly eliminate gingival irritation. The SPEED Mini-Mushroom Hook, which can be found on both the Central and Lateral Incisor brackets, is the smallest, cleverest integral hook for use with anterior elastomerics.

Speed bracket body- features a multi-slotted, miniature bracket body. It has a rounded shape with a horizontal Auxiliary slot and an edgewise archwire slot (.018" or.022") for patient comfort (.016" x.016"). It shields the Spring Clip from harm caused by occlusal forces during treatment.

Speed super-elastic spring clip- 400% more elastic than Stainless Steel, exhibit no loss of resiliency during treatment. Superior Performance and Superior Durability.

Speed hooks- Along with the Mushroom Hook, the device is made to fit a number of prefabricated square wire elastic hooks. The SPEED appliance cannot be used with conventional Kobayashi type hooks; The practitioner has a limitless amount of flexibility when applying intra-oral forces because hooks come in a variety of designs and can be put into the auxiliary slot. These are more durable and stable, and since they have less of a propensity to sway or distort, they allow dentists to more effectively apply the necessary force to the teeth.

Speed auxiliary slot- has two horizontal slots; the archwire slot and the auxiliary slot. The auxiliary slot is.0165" square in size and is situated to the occlusal of the archwire slot. Supports .016" x.016" auxiliaries, ligature wires, secondary archwires, sectional archwires, and pre-formed SPEED Hooks.

ISSN: 0975-3583, 0976-2833 VOL12, ISSUE07, 2021

Wire auxillaries- Wire auxiliaries that pass through one or more brackets horizontal lingual slots can frequently be used to move unusually rotated, uprighted, or intrusively positioned teeth more effectively.

The SPEED Arch Wire Hook- allows for the use of intra-arch or inter-arch elastics with any archwire size or form. The hook is made up of an exterior less tapered female collar, a little less tapered and split inner male component that fits inside it frictionally. These come in six different sizes to accommodate a variety of wire shapes and types. Its key benefit is that it won't budge or creep along the archwire. Its "load and lock" process is incredibly easy and quick, saves chair time, and offers a secure method of delivering force. As the male and female components are pushed together, they get "cold-welded." The tapered hook's grip on the archwire becomes tighter as the applied force increases. This "door jamb" effect prevents the hook from moving along the wire in any way.

Split stops- Many SPEED users choose SPEED Split Stops to stop space opening since the SPEED appliance doesn't need ligature ties to entrap the archwire.

Passive zone / active zone- Depending on the size of the archwire and the severity of the malocclusion, the Spring Clip offers variable degrees of engagement. The "Passive Zone" in the.022 slot is where.018 round archwires or smaller operate, reducing friction at the interface between the slot, the archwire, and the spring clip. As treatment advances with larger wires functioning in the "Active Zone," spring clip engagement rises as wire dimension exceeds.018 round in the.022 slot (.016 in the.018 slot). Exceptional tooth control in finishing and ease of archwire selection are guaranteed by the close link between full size wires, the archwire slot, and the Spring Clip.

FULL 3-DIMENSIONAL CONTROL

With respect to three axes, the SPEED appliance has been built for precision control:

1. The gingival-occlusal axis (rotations)
2. The Labiolingual axis (tipping)
3. The Mesiodistal axis (torque)

Rotational control- No rotation of the bracket around the occlusogingival axes away from this position is possible without subjecting the spring to additional elastic deformation. When even the tiniest departure from the desired relative position occurs, restoring forces are automatically set up. The spring will exert constant pressure until the desired bracket-arch wire relationship is achieved.

Torque control- For complete torque control, SPEED's edgewise slot will accept archwires that are square, rectangular, or SPEED Wire shaped. Archwires made of stainless steel, nickel titanium, and SPEED Wire have a round-rectangular profile. Because of its distinct design, this archwire works better with SPEED brackets to express all of the built-in torque. The most recent orthodontic ideologies are reflected in prescriptions like The HANSON Torque Prescription, The Medium Torque or MBT Prescription, The Regular Torque or Roth

ISSN: 0975-3583, 0976-2833 VOL12, ISSUE07, 2021

Prescription, or The High Torque Prescription, all of which are employed successfully in numerous SPEED clinics.

Tip control- The proportional size of the arch wire and bracket slots employed determines how well an edgewise appliance controls tooth tipping. The better their fit, the better the control. However, a close fit, especially for sliding mechanics, between the arch wire and the bracket slots might result in excessive frictional binding. Some design elements of the SPEED appliance help to solve these issues. It enables more precise control over tipping motions, more light force consistency, and less frictional resistance to sliding mechanics.

The speed opening instrument- Dr G.H. Hanson, the creator of the SPEED Appliance, created the SPEED Opening Instrument especially for use with the SPEED appliance. For opening SPEED Spring Clips, the thin single prong is perfect. The forked end can be utilised for a number of things, including seating and directing archwires and closing Spring Clips.

ARCH WIRE PROGRESSION

Speed Supercables - is a Super Elastic Nickel Titanium Coaxial Arch Wire that comes in 0.016", 0.018", and 0.020 sizes. It has 7 strands of wire wrapped with a "large pitch." with a force that is one-third that of a thick 0.016 Nickel Titanium arch wire.[4] Due to its special design and super-elastic characteristics, Supercable can be fully engaged as an initial aligning and levelling arch wire without undergoing plastic deformation. The supporting tissues are subjected to near-optimal forces, which results in little to no discomfort for the patient. Sharp bends can be accommodated by Supercable without requiring a permanent set. Its distinctive structure and design, along with its extraordinarily elastic qualities, enable it to heal totally even when severely deformed.[5] Never flame the end of Supercables.

SPEED D- The special half-round, half-square shape of wire makes it perfect for complete 3-Dimensional control while sliding. Even when used as a sectional mechanics, the special D-wire shape works in perfect harmony with the Speed spring clip to ensure accuracy and control during sliding mechanics.

Hills dual-geometry arch wire- is the best wire for anterior retraction and sliding mechanics while yet maintaining practically flawless torque control. Designed with a square anterior portion and a round posterior portion to maximise sliding mechanics in the posterior regions while preserving anterior incisor crown torque. The Hills wire offers the rigidity required to avoid unfavourable consequences when tooth translation is occurring. Two diameters of the Hills wire are produced: 0.018 inch x 0.018 inch anterior with 0.018 inch round posterior and 0.021 inch x 0.021 inch anterior with 0.020 inch round posterior.

ISSN: 0975-3583, 0976-2833 VOL12, ISSUE07, 2021

Speed finishing arch wires (Nickel titanium and stainless steel**)-** The "SPEED" finishing arch wires bevelled labial-gingival design promotes full expression of the interaction between the arch wire, arch wire slot, and super-elastic spring clip. Any variation in the bracket's location in relation to the wire causes the spring clip to deflect, storing the necessary energy for recovery. With the help of careful, three-dimensional dental placement, this energy is softly released. This quarter round arch wire design also makes it easier to insert wire and close spring clips.

The SPEED appliance is most responsive to very light forces, as was already mentioned. Both mechanically and biologically, using mild forces is helpful. From a biological perspective, applying mild force reduces the likelihood of such undesired occurrences as root resorption happening.[6]

CONCLUSION

Due to years of hard work and specialised knowledge, orthodontics is now regarded as a recognised specialty of dentistry. While preserving effectiveness and a reduced treatment period, there is still much progress being made in the field of aesthetics. If dentistry as a whole, including orthodontics, is to continue as a profession, it must constantly re-examine its past and identify essential and pertinent ideas to address the current issue.

The SPEED appliance, is the result of almost 25 years of design improvement. SPEED has worked as a catalyst for the subsequent appearance of similar and alternative self-ligating devices, reflecting original design aims that included increased patient comfort, shorter treatment times, and reduced operator time. The SPEED appliance's light, continuously-acting nickel titanium spring clip sets it apart from other self-ligating brackets. This enables extremely precise and controlled tooth movement over the course of the treatment in a setting with predictable low friction. Its ability to store relatively significant amounts of energy for release at a desirable slow rate makes it well suited for sliding mechanics.

REFERENCES

1. Hanson GH The SPEED system: a report on the development of a new edgewise appliance. Am J Orthod 1980; 78:(3): 243-65
2. The Russell attachment and its improved advantages Jacob Stolzenberg, Brooklyn, N. Y.
3. Principles in contemporary orthodontics.
4. Blake M, Garvey MT: Use of SPEED Supercable with sectional mechanics. J Clin Orthod 32:227-229, 1998
5. Biju Sebastian Alignment efficiency of superelastic coaxial nickel-titanium vs superelastic single-stranded nickel-titanium in relieving mandibular anterior crowding The Angle Orthodontist: July 2012, Vol. 82, No. 4, pp. 703-708
6. Berger JL, Byloff F.K. The Clinical Efficiency of Self-Ligated Brackets J Clin Orthod 2001; 35:(5):304-8