The RES® - Ratchet Expansion Screw
“A New Force In Expansion”

Expansion of the dental arches has become an integral part of orthodontic treatment, especially when treating patients in the mixed dentition. Arch development is one term used to describe both expansion and in some cases anteroposterior lengthening of the arches. Over the years, various appliances have been used for expansion, with a current bias towards those that do not require patient cooperation, ie: fixed rather than removable systems.

The Rapid Palatal Expander is the most well known and widely used expansion appliance. It combines the predictability of success, relatively fast results and favorable long term stability. In addition, the RPE has been a cornerstone of upper arch expansion for well over 50 years and thus is not subjected to the “latest design of the month” club in terms of new appliance therapy. Lower arch development has in the last 10 years or so greatly increased in popularity. As part of the treatment armamentarium used when treating younger patients, lower arch expansion allows the full compliment of permanent teeth room to erupt.

The traditional RPE screw features an all metal body that houses the screw spindle and guide pin. The spindle which has small holes to receive the activation key is threaded to the housing which allows the right and left of the body to move apart when the screw is turned. Each body half is in turn attached to bands or crowns on the anchor teeth to deliver the force to the teeth and supporting alveolar structures. Another popular design (the Haas Expander) utilizes acrylic in the vault for additional force application to the palate. When employed on the lower arch, a smaller screw unit is used and is typically attached to bands or crowns on the first permanent molars.

Accurate Band and Crown Placement

From Your Practice to our Laboratory

Orthodontic practices are continually seeking ways to save time, improve efficiencies and increase the quality of patient care. Laboratory services and laboratory-fabricated appliances from Specialty Appliances help accomplish these objectives. When evaluating efficiencies of laboratory fabricated appliances, there are several factors to consider. The process must flow smoothly from the practice to the lab and back. One central factor assuring a smooth and efficient flow is the accuracy of models, which of course is a function of impression taking and model pouring.

Several popular designs fabricated at Specialty utilize bands on molars, including Rapid Palatal Expander, Pendulums and Herbst appliances. As practices know from experience, clinical delivery of these types of fixed “metal” appliances can be challenging if there is even the slightest discrepancy in the fit from the model to the mouth. This is especially true when bicuspid bands are also included in the prescription.

The traditional method used to construct metal appliances is to select and size bands in the mouth and take an impression over the seated bands. The bands are then removed from the patient teeth and seated back into their indentations in the alginate, where they are secured using wax or pins. Pouring the impression with orthodontic stone then captures the bands in the ideal position, resulting in a working cast ready for the laboratory. While many practices use this technique successfully, it can be problematic if certain pitfalls are not avoided and the bands get out of position.

In a recent investigation in our laboratory, 30% of cases were found to have discrepancies in the accuracy of the bands in the final model. The most common problem we see is bands that have moved 1 to 2mm sub-gingival on the model, typically the result of under-seating them in the alginate prior to pouring.

Awareness of this common occurrence can prevent major inconveniences for all involved; the doctor, patient, parents and laboratory. As mentioned earlier, even a slight misalignment of the bands in the model can cause an appliance to not fit in the mouth. Questions about band accuracy and the usability of the model means that the lab technician has to make frequent “judgment calls”. The end result can lead to a wasted appointment with the practice trying to deliver an unacceptable appliance. There is of course also significant time required to recall a patient for the entire procedure of fitting bands and redoing the model. Focusing on accuracy instead can really pay off.

Accurate Band and Crown Placement

Successful band and crown placement is a simple and critical process. When evaluating the band and crown placement process, the quality of band and crown fitting can be directly attributed to the accuracy of the bands in the model. If the bands are not seated accurately in the model, they may not fit properly in the mouth.

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As is typical with techniques in the field, there is more than one way to accomplish the goal. Let’s review the most common methods and the pros and cons associated with each:

**Bands Secured with Wax:** This technique has been around the longest and is probably the easiest for the staff. Hot “sticky wax” is dripped over the bands seated in the alginate, which in theory captures and holds them during the pouring of the stone. The main problem is that the wax does not really adhere well to alginate. Without good adhesion, any slight over-vibration during the pouring process will allow the band (or crown) to move out of position. Unfortunately, this is usually discovered after the stone has dried and more than likely the patient has left the office.

**Pinning Bands with Wires:** This is an excellent technique for securing bands in an impression. Small sections of wire (staples work well) are inserted into the alginate just over the exposed edges of the bands. Make sure to use 2 wires per band and secure them (using tweezers) over the mesial and distal third of the bands so they cannot rotate. One problem we see with this technique occurs when the bands are not completely secured with the wires. This allows the bands to move during the pouring process, causing an inaccurate final model.

**Super Glue Technique:** Super Glue works well as it adheres to the bands and it does adhere to alginate. A couple drops of glue on the inside and outside of each band hold it in place. The only caution with this technique is when too much glue is used. If not cleaned from the final model, the excess glue can contaminate the solder joint area as the metal is heated. This is why only a small amount of super glue on each band is required.

**Specialty Lab Services to Fit and Seat Bands**

**Specialty Seats Doctor’s Bands:** Specialty offers two lab based services that helps avoid many of the variables associated with bands moving in the impressions. These alternatives do not require the practice to pour an impression holding bands at all.

Both are indirect techniques that can also save considerable time for the office. The first is where bands are sized and seated in the mouth to assure accuracy. Then, instead of taking the impression over the bands and pouring them in the traditional manner, the bands are removed prior to taking a regular impression. At Specialty, we will then relive the model in the appropriate areas, and your bands are re-seated accordingly for making the appliance.

**Specialty Provide and Fit Bands:** The other alternative used by many of our accounts is a complete indirect band sizing and fitting procedure in our laboratory. For this we prepare the model and select and fit the proper sized bands. The standard band we supply is slightly thicker than conventional orthodontic bands, which also has the advantage of a stronger final appliance. Another advantage with this method is the saving of the separation appointment because the model sent to Specialty does not require band space. The spacers are placed after the impression is taken and the band space is gained while Specialty Appliances is constructing the appliance.

One of our primary goals is to provide appliances that can be delivered with a minimal amount of clinical adjustment. Using the above suggestions and techniques will help insure we receive construction models that help us produce accurate appliances. Please feel free to contact Arlen Hurt at Specialty Appliances with any questions regarding this article, or for additional information about our services.

Toll Free: 1-800-522-4636 E-mail: ahurt@specialtyappliances.com
The RES® Ratchet Expansion Screw

“A New Force In Expansion”

Today’s RPE screws have changed little from the designs introduced in the 1940’s in terms of the overall working mechanical properties. Force is delivered by activating the screw through the center spindle using a wire “key” which is done at home by the parents. Treatment typically takes about 12 weeks including active expansion followed by a stabilization period.

Looking to improve on RPE designs, several manufacturers have made progress in reducing the overall size of the RPE for use in both the upper and lower arches. There remains however an underlying problem with the basic design of these devices, the potential for the screw to “back up” during treatment. Despite extremely tight design tolerances and manufacturing excellence, most orthodontists can relate to patients undergoing palatal expansion where the results were compromised by the occasional failure of the screw to hold the expansion.

As with any portion of treatment, when problems occur during palatal expansion, valuable time is lost which impacts the patient and parents as well as the practice. Oftentimes, RPE is the initial phase of treatment and is viewed by the parents and patients as a time to build confidence in the practitioner which can be a challenge when failures of the appliance occur.

The RES® is an all new RPE design aimed at eliminating back-up of the screw. A unique “ratchet clip” similar to the design found in a Swiss watch mechanism is used to engage special indentions on the center spindle as the screw is activated. With each quarter turn of the screw, the spring force of the clip “opens” as the spindle travels on the round contour of the housing. A corresponding “locking” of the clip against the spindle occurs as the leading edge of the clip engages in the recessed portion of the spindle. This action of the spring clip makes it virtually impossible for the screw to back-up as the mechanical forces simply do not allow the spindle to turn backwards against the clip. In a clinical situation where the screw does have to be turned back, a special extra long activation key can be used to “deactivate” the spring clip and reverse the function.

Another valuable and practical feature of the new RES® screw is that it emits an audible “click” when activated. This lets the parent and patient know that the screw has been activated properly. The ability to ratchet and click eliminates all the confusion of how to activate the expansion screw. Each activation is precisely equal to the previous and the succeeding activation enabling the delivery of a constant force over time. The activation holes are oriented in exactly the same place each night, making it easy to get the key in position. The RES® is a simple but important improvement in transverse expansion.

Before and after photos of a patient treated with the RES®. The function of the screw is consistent and predictable, producing treatment results you can count on.

The RES® is truly a “breakthrough” design in palatal expansion as it removes the guesswork and uncertainty from treatment. Parents, patients and your staff no longer have to wonder if the screw is turning properly and not “backing up” since the clip locks each movement and results in an audible “click” that parents can actually hear!
Palatal Expansion is an important part of orthodontic treatment. The primary appliance of choice is the RPE, or Rapid Palatal Expander. Despite the benefits of rapid palatal expansion, many clinicians have been frustrated by these appliances on occasion “backing up” during treatment. Oftentimes, RPE is the initial phase of treatment and is viewed by the parents and patients as a time to build confidence in the practitioner which can be a challenge when failures of the appliance occur.

The RES® has several unique features including the “ratchet clip” as shown. As the screw is turned or activated, the leading edge of this high tempered clip engages the vertical indents of the revolving center spindle. Each 1/4 turn produces subsequent expansion which is ensured by the locking action of the clip against the spindle.

The RES® is available from Specialty Appliances in several ways. First, it can be incorporated in any appliance we fabricate including Rapid Palatal Expanders, Lower Fixed Expanders and all types of Herbst Appliances. Doctors with their own in-office laboratories can order the RES® directly from Specialty in convenient packages of 10 or 100 to save money on the unit price. You can also request the RES® on appliances ordered from other commercial laboratories as Specialty is making the RES® available to all other laboratories as well.

Ordering Information:
The RES® is available individually, or in packages of 10 or 100.

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