

NEW

NATURA®

SILICEOUS COPOLYMER BRACKETS



Aesthetically reliable to guarantee perfect therapeutical functionality and rounded edges to secure the best comfort. Manufactured out of special siliceous copolymer with enamel-like translucence, high mechanic and strength properties, bio-compatible and highly resistant to oral fluids. Diagonal round angulation, torque in base, low friction to arch wire, calibrated dimensions to optimize the bio-mechanic properties with a shorter treatment time. Natura® brackets: the natural answer to aesthetic treatments.



Roth System				Angle	Wing	Size	Part	Part	Image
1	2	3	4			01974-000*	02274-000*		
1 1	2 2	3 3	4 4	+12°	-5°	R	FS101-02	FS121-02	
						L	FS101-03	FS121-03	
2 2	3 3	4 4	+8°	-5°	R	FS102-02	FS122-02		
					L	FS102-03	FS122-03		
3 3	4 4	5 5	0°	+13°	R	FS173-02	FS113-02		
					L	FS173-03	FS113-03		
4 4	5 5	5 5	-7°	0°	R	FS179-02	FS119-02		
					L	FS179-03	FS119-03		
5 5	5 5	5 5	-7°	0°	R	FS179-02	FS119-02		
					L	FS179-03	FS119-03		
1 1	2 2	3 3	4 4	0°	0°	R	FS183-05	FS120-05	ASSORTMENTS
						L	FS183-05	FS120-05	
2 2	3 3	4 4	5 5	-11°	+7°	R	FS173-06	FS113-06	
						L	FS173-07	FS113-07	
3 3	4 4	5 5	5 5	-13°	0°	R	FS174-06	FS114-06	
						L	FS174-07	FS114-07	
4 4	5 5	5 5	5 5	-20°	0°	R	FS175-06	FS115-06	
						L	FS175-07	FS115-07	

Natura® brackets in siliceous copolymer are available for Roth and Ricketts systems.



Grum-Rax Maxillary Expansion Appliance

NON-EXTRACTION INNOVATION

by Duane Grummons
D.D.S., M.S.D

The younger the patient receives orthopedic expansion therapy, the more the face responds to this therapy and the more stable is the result. The older the patient when this therapy is provided, the less orthopedics that can be achieved, and the more that a treatment plan must be modified or limited by the facial structure and maturity. (Fig.1)



Fig. 1 - Preformed (Leone) Grum-Rax expansion screw. The arms are downsized for easy bending and occlusal placement.



Fig. 2 - Ball hooks are an option. The molar .032 springs are removable for adjustments.

Many expansion appliance designs and innovations have occurred over the past 40 years, subsequent to the Haas and Hyrax designs. Molar distalizing features were followed by further hybrid variations. The advantages and hyper-efficiency attributes of the Hilgers' PEN-DEX/PhD and the Grummons GRUM-RAX make such appliances very effective and biologic. These Grum-Rax

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Grum-Rax / RPE 3D

NON-EXTRACTION INNOVATION

- Transverse
- Molar rotation
- Incisor relocation
- Facial orthopedics
- Reproximation
- Transverse first; vertical control then A-P

molar springs are fully removable. This has advantages for activation, re-shaping, unilateral activation, asymmetric movements and oral hygiene. Another option is to add the molar distalizing springs in 2-4 weeks after expansion and space gaining process. (Figs.2-3)

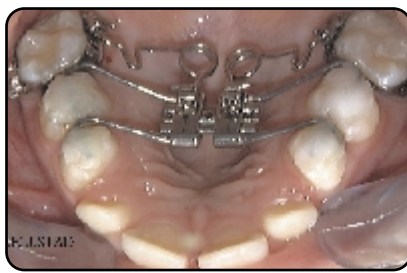


Fig. 3 - Expansion appliance with pre-welded sheaths (.036) and .032 blue stainless (Pozziloy 040-40-0004) or TMA springs. Leone molar sheaths (Right #G2846-02, Left #G2846-03) on bands and laser-welded to screw.

Appliance Placement

Steps in one-visit GRUM-RAX appliance:

1. Seps on the upper first molars (or slenderize contact on deciduous molars)
2. Fit first molar bands with lingual sheaths
3. Upper impression/model after molar bands in place
4. Shape preformed Grum-Rax (Leone) to work model or directly in mouth
5. Place appliance - same visit - light cure bonded occlusal rests
6. Patient information, instruction, encouragement.



Fig. 4 - Appropriate molar springs activation. Activate molar springs every 8-10 weeks. Expand midline screw 1 turn every 1-2 days.

Activation

- Transverse changes should begin before molar activation and distalization are fully underway.
- One midline expansion screw turn (1/4 revolution) each day or every other day to initiate cellular changes. This gentle activation schedule gains patient confidence, trust and treatment response.
- Maxillary turns are one per day, or one every other day,

with either of these accomplishing sutural expansion. The slow but consistent activation produces desired orthopedic changes along sutural sites of the maxillae. Begin with a goal of 10-15 turns during first 2-4 weeks - then continue turns to clinical objective. (Fig.4)

- Midline screw can be fixated with light cure material (usually not necessary) after total turns are completed.
- The Grum-Rax appliance is bonded into place and the molar springs are activated 10-15 degrees beyond the molar sheaths. This permits light activation for initial molar derotation. The movement begins by distal rotation around the palatal root, with space opening mesial to the molars within weeks of placement. (Fig.5)
- Increased inter-root distance confirms true space gain. (Fig.8)
- Reinsert into molar sheaths - reappoint 6-10 weeks.
- Overcorrection by 20 - 30% is recommended beyond the desired transverse and molar distalization outcome. Rebound is anticipated, and this overcorrection represents planned relapse after appliance removal. (Figs.6, 7, 9, 10, 11)

Maxillary Skeletal (structural) Expansion Treatment (RPE/RME).

- Grum-Rax activation suggestions:
 - Youth - 1 turn every 1-2 days
 - Adults - 1 turn per day, if post-corticotomy surgery (surgically-assisted maxillary expansion) 1-2 turns per week, if nonsurgical approach - periodontal conditions determine the limit of maxillary expansion. 44 turns = 11 mm width increase 36 turns = 9 mm increase

Clinical Aspects

- Prescribe Peroxyl rinse and topical fluoride daily while wearing the Grum-Rax.
- Reactivation of the upper molar distalizing springs occurs at 8-10 week intervals, with 15 to 20 degrees (or about) 6-8mm of distal activation of the arm which inserts into the molar sheath. This is repeated every 8-10 weeks until the desired molar distalization is accomplished. Generally, about 5-6 mm of space can be created mesial to the maxillary first molars.
- Leave appliance in an extra 2-4 months once activations and movements are completed. This holds overcorrection and contributes to further molar uprighting and bone maturation.
- Inter-root distance/gain between maxillary molars and premolars indicates true space gain in buccal segments of arch.
- Grum-Rax appliance provides superb anchorage during incisor alignment with utility arch or continuous arch from molars to incisors.
- Optimal smile esthetics can be achieved as the incisors are placed in the smile line utilizing the Grum-Rax for stabilization and/or anchorage at this phase of full orthodontic therapy.
- Typical transverse change is about 4-10 mm of inter-molar distance, once the expansion turns are completed. A 9 or 11 mm Leone expansion screw is most often utilized. Sometimes, a second appliance may be needed in cases of severe maxillary transverse hypoplasia and/or airway

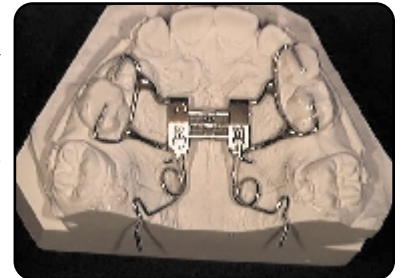


Fig. 5 - Activate helix 15-30 degrees and insert into molar sheath. Appliance provides anchorage for utility arch to move incisors to best smile alignment position.



Fig. 6 - Once 1st molars achieve distal movement, the next premolar or deciduous tooth should be released/unlocked to migrate distally.

obstruction or craniofacial conditions, in which more expansion and net transverse changes are required.

- There is a molar helical loop. It is advisable to keep the expander in for 8-12 weeks after the last activation. If oral hygiene is a challenge, then removal of the Grum-Rax may be indicated. However, most youth can be taught and encouraged that such on-going

maintenance beneath and around the appliance can be effective. During this time after activations are completed, the sutural sites mature and the molar roots which have been distalized can have their roots upright (inter-root distance optimal.) These movements are beneficial so that less rebound/relapse occur upon removal of the appliance. Thus, the net gains in the transverse, distalization and vertical dimension areas are more completely accomplished and maintained. Root ratings for optimal forces (Ricketts) are at 80-120 grams per side for molar distalization without mesial movement of the premolars.



Fig. 7 - Later, the second premolars are disconnected to distalize, thus adding to space gain.

When upper second molars are in place, activations against the molar should be lighter. This permits the molars to gradually rotate distally. The second molar is nudged distally in tandem with the first molar distal rotational movement. In certain cases, removal of the upper second molars and substitution of the upper third molars may be indicated. This is a less common approach, but appropriate when crowded in a broad facial pattern with a smile display which needs to keep the upper premolars in the final result. Ultimately, the crowded premolars and cuspids are brought into optimal position after the first molars are optimally rotated and placed. This is followed by eruption of the upper third molars into the second molar positions. While this approach is truly an extraction approach since upper second molars might have been removed, it finishes with four upper premolars appearing functionally and aesthetically.

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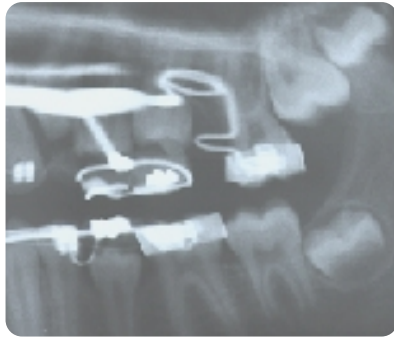


Fig. 8 - Significant inter-root distance mesial to uprighted and distalized molars.

Removal

- Unhook the springs from the molar band sheaths.
- Trim and reduce the bond covering the areas of the occlusal support wires. A round diamond bur will effectively do this. Loosen and remove with instrument pressure thereafter.
- Gently, but firmly, lift the bond and wire off those teeth - release one tooth and one side at a time. Smooth away remaining bond material - leaving some in occlusal grooves to serve as a protective sealant.

Maintain the Gain

- Overcorrection by transversely 20-30% is suggested. Molar rotation overcorrection is recommended.
- Immediately upon GRUM-RAX removal, place a stabilization device/appliance, such as Nance; or transpalatal arch

(TPA); or vacuum-formed palatal appliance; or a utility arch with tip-backs and molar stops, etc.

- An occlusal and/or buccal bonded stabilization .030 wire to the next tooth mesially could also provide effective stabilization of space mesial to the molars.

Relapse Concerns:

- Over-correction is planned, with expanded molar transpalatal width diminishing by about 20% within the first year subsequent to maxillary expansion. Similarly, adults relapse about 20-30% of the trans-molar distance achieved subsequent to the removal of the maxillary expander in surgically assisted expansion/corticotomy situations. Greater expansion is accompanied by greater relapse, but this also nets out greater gain. The key is to incorporate this transverse benefit, and eventual rebound and narrowing into the treatment plan so the 20% relapse becomes part of the treatment objective so the desired outcome can be planned/maintained/retained. This post-expansion rebound is not a contraindication to do the expansion; instead, it becomes part of the clinical plan to overcorrect by the necessary amount so the expansion nets out the treatment objective for each individual patient. For example, if 10mm of transpalatal expansion is achieved, one can expect about 8mm of trans-molar distance to be retained long-term on the growing patient.
- Dental relapse is about 20% of the transverse development (intermolar width) and this should be anticipated. Long-term, a 30% rebound after molar expansion occurs in adults. Plan this into the treatment approach and objectives.
- Apply overcorrection principles and concepts.
- Subsequent to removal of fixed expander, a removable maxillary stayplate (transverse appliance) with a mini Leone expansion screw can be placed to maintain or further increase molar arch width by nudging the molars wider with 1-4 activations per week (net inter-molar removable appliance width gain of 2-4 mm. is a typical clinical limit.).



Fig. 9 - Helical loops and horizontal arms on springs at molars permit derotation, intrusion or extrusion, uprighting and asymmetric 3-dimensional movements.



Fig. 10 - Second premolars have drifted, or bracketed and retracted distally after occlusal arms were removed. Appliance is now ready to be removed for movement of first premolars distally to unlock spaces for cuspids.

Facemask Therapy with Grum-Rax

- When facemask therapy is applied in conjunction with maxillary palatal/sutural expansion, then the strategy changes. Then slow expansion turns of 1 or 2 turns per week influence adjoining sutures

of the maxillae disjunction for a prolonged time. Thus the protraction benefit of the facemask is greater. Several months of gradual expansion with 8-10 hours per night of facemask wear can produce about 2 mm of skeletal change anteroposteriorly (point A) and typically 2-3mm of dentoalveolar change at the occlusal level. This nets 3-5 mm of class III reduction and change. The response is certainly more orthopedic for younger patients, while the older patient is mostly dental change and occurs more slowly. Hence, the number of months in the facemask depends not only on the degree and complexity of the problem, but also upon the maturation of the patient. The 8-12 year old patient shows much more skeletal and dental response, while the teenage patient has primarily dental alveolar and tooth position changes with the facemask.

- Buccal arms are soldered to the expander so elastics to the facemask can produce anterior and inferior relocation of the midfacial component and associated upper teeth. This improves and increases the maxillary dental display upon smiling as indicated. This permits the occlusal plane to tip down in front, which is usually desired and indicated.
- The facemask and expander can be applied after surgically assisted maxillary expansion procedures and even after



Fig. 11 - The second premolar was unlocked and floated distally, while the first premolar was held by bonded expander arm.

so nonextraction upper arch therapy can be achieved simultaneous with the upper arch being relocated down and forward.

- When is transverse increase indicated in the upper arch? Essentially, all class II malocclusion patients have maxillary transverse deficiency with compensation in Curve of Wilson (transverse occlusal plane.) Thus, the lower posterior teeth typically need some buccal uprighting to get the roots beneath the crowns for best occlusal and periodontal loading of teeth down their long axes. As maxillary expansion occurs, this permits the lower posteriors to be uprighted transversely. When the lower arch is in distoverasion (class II relationship), the upper and lower arches usually compensate by remaining narrow. As the lower arch develops (is postured) forward, the upper must become wider in the posterior segments to optimally relate.

Why Nonextraction Orthodontics is Emphasized

- Facial and dental harmony
 - width of smile fills buccal corridors
 - lip support best
- Functional occlusion is best
- Patients and parents prefer this
- Less time in braces
 - less treatment time and visits
- Less or minimal root resorption problems
- Periodontal advantages
 - tissues tolerate nonextraction approach better
- Orthognathic surgical results
 - generally superior with nonextraction, especially in the upper arch

TMD patients

- need posterior teeth for functional support; poorly tolerate orthodontic elastics or traction mechanics, and prolonged extraction therapy.
- Superior results are generally achieved
- Stability and long-term outcomes optimal
 - success seems better

Summary Remarks

- Class I malocclusions may have arches that are slightly or significantly constricted. These require transverse uprighting change (depending upon periodontal status) and unlocking as orthodontics is initiated. This space gaining in the arch helps align teeth and diminish the need for extractions in mild/moderate situations which have crowding. More significant crowding requires consideration for tooth extraction to optimize the relationship of remaining teeth in the finished result.
- Class II cases typically need transverse expansion and/or uprighting in the initial phase of treatment; class III cases typically need maxillary expansion in the early phase of treatment; and many class I cases need transverse development. The transverse dimension has treatment priority, followed by vertical control and management, with sagittal and anterior/posterior correction. (Fig.12)
- Class III situations, typically display an upper arch with a transverse maxillary hypoplasia in varying degrees. It is common that maxillary orthopedic expansion and/or lower dental uprighting is done in class III management of cases. More often, the skeletal maxillary expansion achieves effective transverse gain.

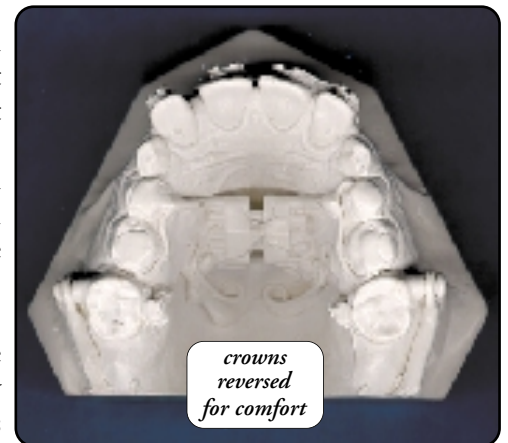


Fig. 12 - The GRUM-RAX combined with the Herbst achieves hyper-effective orthopedics and arch-length and width gains.