

“Play Ball” Hands-On Fabrication of Custom Athletic Mouthguards

Kentucky Dental Association Meeting
March 6, 2015

Douglas L. Lambert, DDS, FACD, FASD, FASDA, ABAD



Douglas L. Lambert, DDS, FACD, ABAD

Dr. Doug Lambert, DDS, FACD, FASD, FASDA, ABAD



- Partner: Cosmetic, Family & Sports Dentistry, PA. Edina, Minnesota
- 1980 B.S. in Business from the University of Minnesota Carlson School of Management
- 1984 D.D.S. from the University of Minnesota School of Dentistry
- Involved in organized dentistry
- Lecture nationally and internationally on esthetics, composites, and sports dentistry
- Independent consultant and evaluator for many dental manufacturers
- Team dentist for the WNBA Minnesota Lynx for the past twelve years

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Options

Options

Options

Options

Options

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Confusion?



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Minimally Invasive

Tooth Banking

Less is More

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My Treatment Philosophy: The Four Principles

- BE CONSERVATIVE
- PROVIDE FUNCTION
- AESTHETICALLY PLEASING
- GOOD LONGEVITY



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The "A Team"

- Athletic Trainer
- Team Physicians
- Oral Surgeon
- Endodontist
- Periodontist
- Orthodontist
- Prosthodontist



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By the numbers...



Dental injuries are the **most common type** of oro-facial injury to occur in sports!

(National Youth Sports Safety Foundation)

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Of 11,840 children, ages 5-17, sports accounted for **36% of all injuries!**

(Bijur, Trumble, et al. 1995)

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Studies show that **baseball and softball** have one of the highest rates of dental injury!



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Over 80% of all dental injuries from sports occurred to the **maxillary front four teeth!**

(Davis and Knott, 1984)



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“In football, the oro-facial injury rate (where facemasks and mouthguards are worn) was 0.07%, but in basketball...the rate was 34%.”

(Flanders and Bhat, JADA 1995)



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...the overall injury risk was found to be **1.6-1.9 times greater** when a mouthguard was not worn, relative to when mouthguards were used during athletic activity.



Knapik JJ, Marshall SW, Lee RB et al. Mouthguards in sports activities: history, physical properties and injury prevention effectiveness. Sports Medicine 2007;37(2):117-144.

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The best mouthguard is the one that is utilized during sport activities. **While custom mouthguards are considered by many to be the most protective option,** other mouthguards can be effective if they fit well, are worn properly and stay in place.



Statement on Athletic Mouthguards.
ADA Council on Access, Prevention and Interprofessional Relations
ADA Council on Scientific Affairs 2009.

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Academy for Sports Dentistry

Position Statement: In contact sports, it is critical that the mouthguard provides protection from direct and indirect impact. **It must fit accurately, stay in position during impact, and redistribute the impact's energy.** The criteria for the fabrication or adaptation of a properly fitted mouthguard must include the following considerations:



Academy for Sports Dentistry
Established 1983

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...an ideal custom mouthguard

- It should be fabricated to adequately cover and **protect** both the teeth in the arch, and the surrounding tissues.
- It should be **fabricated on a stone model** taken from an impression of the athlete.
- Adequate thickness in all areas to provide for the reduction of impact forces. In particular, a **minimum of 3mm thickness** in the occlusal/labial area.

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- It should have a seated **equilibrated occlusion** that is balanced for even occlusal contact. This helps to provide for the ideal absorption of impact energy.
- A fit that is **retentive and not dislodged on impact.**
- **Speech considerations** equal to the demands of the playing status of the athlete.
- A material that meets FDA approval.
- The properly fitted mouthguard should be **routinely and professionally examined for fit and function.**

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Learning Objectives for today's workshop...

- Increase your experience base with custom fabricated mouthguards and how to apply it to your practice
- Goals:
 - Gain knowledge in the various types of mouthguards available for our patients
 - How to become a team dentist in your community
 - Fabricate a two layer laminated mouthguard using a positive pressure machine
 - Have some fun!

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Disclosure Statement

I have no financial or personal ownership interest in any of the products and companies discussed in this presentation. However, Dentsply Raintree Essix Glenroe has assisted the Kentucky Dental Association in allowing me to be with you today.



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Questions I get asked...

- How did I become a team dentist?
- How do you become a team dentist?
- What services do you provide?
- How do you get paid?
- Do I have to be at every game?
- Handling emergencies
- What supplies/equipment do I need?



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What's in the bag!

- Gloves, masks, 2 x 2s
- Local anesthetic, topical, syringe, etc...
- Curing light (plug in)
- RMGI (light activated)
- Self-etch dentin bonding agent
- Flowable and body composites
- Battery operated Dremel with burs
- Splinting materials
- Mirror, explorer, perio probe, cotton pliers
- Save-A-Tooth kit
- Other specific dental items...



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Emergency Treatment of Athletic Dental Injuries

Professionally made, specially fitted Custom Mouthguards are recommended for all contact sport collisions sports. See www.academyforsportsdentistry.org

IMMEDIATE (Within 30 min) Treatment:

1. If debris is on tooth, gently rinse with water.
2. If possible, reinsert tooth and stabilize by fitting clean gently on a base or "handpiece". Do not attempt to force tooth back into socket.
3. If unable to reinsert:
 - Place crown on tooth's buccal surface.
 - Place tooth in cold milk.
 - Do not place tooth in water.
 - Do not place tooth in paper towel.
 - Do not place tooth in dry container.
 - Do not place tooth in hot liquid.
4. Store in plastic bag. Reinsertion within 30 minutes has the highest chance of survival. "Transport IMMEDIATELY TO DENTIST!"

Academy for Sports Dentistry (ASD)
www.academyforsportsdentistry.org

SITUATION (Tooth is avulsed, but strong protruding)

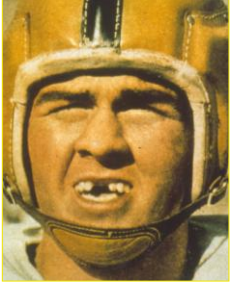
AVULSED TOOTH:

1. Handle tooth by the crown.
2. Do not attempt to clean tooth.
3. Do not attempt to reinsert tooth.
4. Do not attempt to force tooth back into socket.
5. Do not attempt to use tooth as a splint.
6. Do not attempt to use tooth as a wedge.
7. Do not attempt to use tooth as a lever.
8. Do not attempt to use tooth as a fulcrum.
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99. Do not attempt to use tooth as a support.
100. Do not attempt to use tooth as a base.

PROPERLY FITTED MOUTHGUARDS SHOULD BE STANDARD EQUIPMENT

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...a little history on mouthguards



- 1913: Boxer Ted "Kidd" Lewis-first use of mouth protector
- 1962: Mouthguard use for football mandated by NAIA and National Federation of High Schools
- 1973: NCAA mandated MG for football
- 1975: AHAUS mandates for hockey
- 1990: NCAA – colored MGs

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"It is estimated that only 4-6% of athletes in non-mandated sports wear mouthguards."



Kvittem B, Hardie N, Roettger M, Conry J. Incidence of orofacial injuries in high school sports. *J Public Health Dent* 1998; 58:288-293.
 Rodd H, Chesham D. Sports-related oral injury and mouthguard use among Sheffield school children. *Community Dent Health* 1997; 14:25-30
 Maestrello-deMoya M, Primosch R. Orofacial trauma and mouth-protector wear among high school varsity basketball players. *ASDC J Dent Child* 1989; 56:36-39.

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Top Ten reasons for not wearing a mouthguard...



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#10: I can't breathe when I wear one

#9: I can't talk when I wear one

#8: No body else wears one

#7: My dental insurance doesn't

#1: I've never been hit in the mouth before!

#5: I play baseball

#4: I have braces

#3: They just don't work for me

#2: I can still get a concussion

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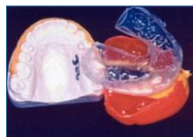
FOUR BASIC TYPES OF MOUTHGUARDS

TYPE I: STOCK MOUTHGUARDS

TYPE II: MOUTH-FORMED or "BOIL AND BITE"

TYPE III. CUSTOM-FITTED

- Vacuum formed
- Heat Pressure Laminate



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STOCK MOUTHGUARDS

“Off the shelf and into the mouth”

- Not fitted to the teeth or alveous
- Teeth must be clenched
- Hampers speech and breathing
- Generally not easily or comfortably worn
- Truly offers little, if any, protection
- False sense of security

RUBBER MOUTHPIECE

**NO BOILING - NO WAITING
Just pop it in and box!**

- Ideal for coaches to have around the gym. Your never have to accept the excuse, "I can't spar, I forgot my mouthpiece" again.
- Perfect spare.
- Helps strengthen jaw muscles.

NEW

Style	Retail Price	Your Cost
#RMP-1 (Single)	\$2.00	\$.99
#RMP-2 (Double)	\$2.00	\$ 1.99

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“BOIL AND BITE” TYPES

- 90-95% of the mouthguard market
- Difficult to achieve a good fit
- 70-99% loss of thickness while fitting
- Cost-effective
- Difficult to breathe and speak
- Difficult to adapt to orthodontic appliances



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High-End B & B MGs



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Shock Doctor Gel Max

www.shockdoctor.com

- (1) GEL-FIT™ LINER custom molds to teeth for a tight, comfortable fit
- (2) EXOSKELETAL SHOCK FRAME heavy-duty rubber shock frame with integrated jaw pads provides maximum impact protection for the teeth, jaw and brain
- (3) TRIPLE-LAYER DESIGN with integrated breathing channel creates maximum protection, fit and comfort



\$9.99
retail

LATEX FREE

NOT FOR USE WITH
BRACES

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Shock Doctor Braces



\$17.99 retail

- (1) INSTA-FIT™ a special Ortho-Channel fits around brace brackets and adapts to changes in tooth position as braces are adjusted, providing an instant fit and protection from lacerations
- (2) 100% MEDICAL-GRADE SILICONE for ultimate comfort, **no boiling or fitting required**
- Meets NFHS wrestling rules requiring full coverage of upper brace brackets if an athlete has only upper braces. Latex free.

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Bite-Tech's “Edge”

- Reportedly positions the user's jaw more naturally than traditional models and results in less nerve compression and increased blood flow
- Multiple layers to increase shock absorbance – Kraton polymer
- Kraton G1652 M is a unique translucent, linear triblock copolymer based on styrene and ethylene/butylene (SEBS) with a Styrene / Rubber ratio of 30/70
- The case material includes a FDA compliant anti-microbial additive that inhibits the growth of bacteria



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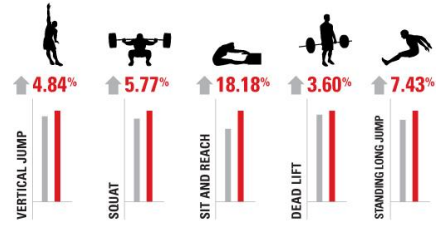
TapouT Mouth Guard

www.tapoutmouthguard.com

- Uses Ever-Mold composite technology to allow you to boil and reboil the MG as needed
- Two guards and two straps in every case
- Allows you to bite into the mouth guard when fitting to "lock the jaw" into place
- Touts enhanced performance because it "properly aligns the jaw"



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EXECUTED WITHOUT THE TAPOUT MOUTHGUARD

EXECUTED WITH THE TAPOUT MOUTHGUARD

EXERCISE	AVERAGE SCORE	AVERAGE FINISH	PERCENT GAIN
VERTICAL JUMP	31 in	32.5 in	4.84%
SQUAT	390 lb	412.5 lb	5.77%
SIT AND REACH	11 in	13 in	18.18%
DEAD LIFT	347.5 lb	360 lb	3.6%
STANDING LONG JUMP	87.5 in	94 in	7.43%

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Gladiator from Sports Guard International



www.sportsguard.com

- Comes in three different versions: Junior (\$45), Pro (\$50) and Elite (\$75) base prices
- Each model increases thickness layers of the EVA for protection (5mm, 6mm and 8mm)
- Junior or Pro for braces
- Numerous options can push any model over \$100
- "Custom" fit from an impression you take on yourself and mail into the company
- Also touts enhanced performance due to oxygen flow from its Free-flow System

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360 Mouthguards

www.360mouthguards.com

- A unique customization module where an athlete can see a simulated version of a mouthguard online that has 360 degree rotation allowing for different views. The athlete can choose their desired colors, logo and text that displays on the guard.
- They act as an intermediary, between the athlete and the dentist making it easier for an athlete to find a dentist to take impressions of the athletes teeth, with their [online dentist directory](#).
- Dentist signs up to be a 360 Dentist (\$10 first year, and \$99 after), but fee of the MG is determined by each office.



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Flavored Mouthguards

www.mogosport.com



- The flavors made from all-natural ingredients
- All flavors and materials are FDA compliant & BPA free
- Quick-release tether included
- Not designed for braces
- \$10,000 "Dental Warranty"

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CUSTOM-FITTED MOUTHGUARDS

- Standard for the profession
- Excellent protection
- High level of patient acceptance
- Can be adapted to mixed dentition or ortho
- Costs will be higher than boil and bite



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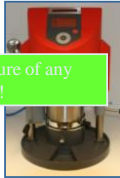
VACUUM FORMED

- Sheet of EVA (Ethyl Vinyl Acetate) is pulled over a cast



HEAT-PRESSURE LAMINATE

- Multiple layers of EVA
- Pushes EVA onto the cast with positive pressure
- Biostar (Great Lakes) or Drufoamat (Dentsply Raintree)



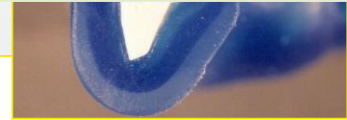
Both have 6 times the pressure of any vacuform machine!

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My options:

1. Two layers of 2 mm or 3 mm EVA
2. One layer of 2 mm or 3 mm EVA with a layer of .040" polypropylene



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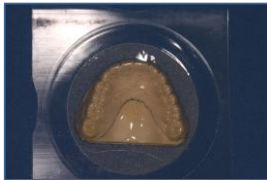
- A custom mouth guard begins with a good impression that has all the anatomical components – including good vestibular extensions.
- The cast should be poured so it has a uniform thickness so the EVA material will also have a uniform thickness and not thin out.

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Trace a line with a pencil to mark the border limits of the mouth guard and outline the palate extensions as well. Coat the model with a separating agent.

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- The laminated mouth guard will be made of two layers of 2mm (or 3mm) of EVA. This will create a more uniform thickness in the final product.
- The Biostar heats to 427° F and applies 4.8 bars positive pressure.

www.greatlakesortho.com


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- Remove the first EVA layer from the model and trim the border with a curve crown and bridge scissors following the outline you made with the pencil.




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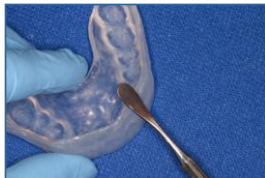

- Replace the trimmed EVA first layer back onto the model.
- Add name, logo, etc...to the surface prior to adding the second layer.

• Apply a second layer of EVA to the first under the same temperature and pressure.

• Remove from the model and trim with the curved scissors as before.



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- There are many ways to smooth and polish the edges of the mouthguard. One option is to use the Brasseler H79-EF acrylic bur with fine staggered toothing.
- Fine smooth the edge by heating a # 7 wax spatula over a bunsen burner and rolling it over the border to create a very smooth finish.
- Note the finished mouthguard with the proper protective thickness of EVA on the incisal.

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Single Sheet vs Laminated

“Double layer or laminate mouth guards have advantages over single-layer ones in terms of longitudinal dimensional stability because of smaller residual stress accumulation during the forming process.”

Miura J et al. Mouthguards: difference in longitudinal dimensional stability between single- and double-laminated fabrication techniques. Dental Traumatology 2007;23:9-13.

www.essix.com
www.greatlakesortho.com

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Athletic Performance Appliances

- A controversial topic for decades...
- Many case histories and anecdotal reports of enhanced athletic performance with the use of an oral appliance (Bill Heintz, Jack Stenger, Harold Gelb, and others)
- Research in the area has been sparse until recently





Moore M. Corrective mouth guards: performance aids or expensive placebos. The Physician and Sportsmedicine, April 1981, Vol 9 (3): 127-130.

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Background on Mouthguards and Athletic Performance


- Literature has suggested that mouthpieces (MP) increase strength (Smith, 1978; Smith, 1981; Fuchs, 1981 & Alexander, 1999).
- Garabee (1981) reported that MP use increased a runner's performance by decreasing injury and increasing training capacity.
- Francis and Brasher (1991) cited that ventilation was improved during heavy exercise with MP use, which suggests a lessened metabolic cost of breathing during exercise.
- Rat models have suggested biting and teeth clenching provide an outlet for tension and stress (Hori, Yuyama, & Tamura, 2004 and Hori, Lee, Sasaguri, Ishii, Kamei, Kimoto, Toyoda, & Sato, 2005).

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Can I become Tiger Woods?

STUDY PARAMETERS:

- Evaluated eight professional golfers (5 male and 3 female)...Avg age = 20.5
- Performed three trials of 10 driver swings and 10 putts with a stabilization splint (2mm), with a mouthguard (2mm), and with no appliance.
- On the 4th trial, they altered the occlusion from bilateral balanced posterior occlusion to unilateral.



Pae A, Yoo R, et al. The effects of mouthguards on the athletic ability of professional golfers. Dent Traumatol 2013; (29): 47-51.

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 UNDER ARMOUR PERFORMANCE MOUTHWEAR
POWERED BY ARMOURBITE™ TECHNOLOGY



Boil and bite version also available

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Theory of how it works...

- Clenching of teeth in humans during physical activity is normal and compresses the TMJ.
- Compression triggers the release excess amounts of stress hormones, like cortisol from the adrenal cortex, and lactate that produce fatigue and distraction.
- Elicits a variety of effects such as increased blood pressure and blood sugar and decreased immune response and protein synthesis.
- The mouthguard positions the jaw in a fashion which reduces the pressure on the TMJ and slows the production of the negative hormones.

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The athletes weigh in...

"I tried it, not only on the field but off the field during workouts. I could feel the difference in my endurance. I was stronger, my body felt better."
Adrian Peterson, Running Back, Minnesota Vikings

"(It) helps me train harder, recover faster, and ski stronger."
Lindsey Vonn, U.S. Olympic Gold Medalist

"When the game is on the line I want my body and mind to be 100% in sync, this technology makes that happen for me."
Marian Gaborik, New York Rangers, NHL All-Star

"The weights didn't feel so heavy."
David Ortiz, Boston Red Sox



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Cortisol and Exercise

- Trials using cadets completed at the Citadel by Dr. Dena Garner, PhD to measure levels of cortisol and lactate with and without MG during various exercise challenges. (2007-2010)
- Statistically significant decreased levels of cortisol and lactate found while wearing the MG during intensive resistance training.
- Current studies will continue assessing the effects of both lactate and cortisol (possible interactions) on activity that is both aerobic and anaerobic in nature.

Data presented at the Academy for Sports Dentistry Annual Session - June 2010, Douglas L. Lambert, DDS, FACD, ABAD

...more research needed


- Additional studies will assess oxygen and carbon dioxide differences with and without a mouthpiece.
- Future studies will address changes in the positioning of the mandible as it relates to airway openings and a possible improvements in performance.

"There is no evidence that's what's causing (the improved performance). There is a relationship between bite and strength, but we don't know why."
Dr. Noshir Mehta, Dean of General Dentistry, Tufts University School of Dentistry

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Pure Power Mouthguard (PPM)

- Based on principles of neuromuscular dentistry
- Naturally aligns the athlete's jaw when the face, neck and jaw muscles are relaxed.
- Enhanced performance results come from a combination of factors, including a more efficiently functioning neuromusculature, and enhanced oxygen flow through an increased airway.
- Must go through a training course to become a PPM certified dentist.
- Four levels: Key (\$695), 1.0 (\$1495), Elite (\$2495), Signature (\$2995)



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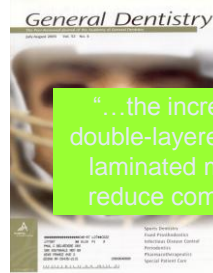
Studies and Research

At this point, no specific studies or independent research by a major university has been done, or if completed has not been released...and the company has ceased activity.

Latest info at www.ppm-help.com

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Comfort and Wearability



- # 1 reason athletes give for not wearing a MG
- Study compared a single-layered vs. double-layered MG

“...the increased thickness of a double-layered heat- and pressure-laminated mouthguard does not reduce comfort and wearability.”

...basketball regularly in a rec league wore both MGs for two weeks

Kerion B. Loos L. Comparing comfort and wearability between Type III single-layered and double-layered EVA mouthguards. Gen Dent 2005;53:261-264.

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Mouthguards as a Petri Dish!

- Mouthguards harbor a wide range of opportunistic and pathogenic bacteria, as well as fungi, including molds and yeast, creating a complex biofilm
- Football players: soil microorganisms, yeasts and molds
- Hockey players: Gram-neg bacteria and yeasts (Candida)
- Two reports: Both 13 yr old football players
 - Leg injury complicated by bacteria traced to MG
 - Exercise-induced asthma (EIA) complicated by yeasts and molds in MG
- Authors suggested discarding the mouthguards on a **weekly basis!**



Glass R, Wood C, Bullard J, Conrad R. Possible disease transmission by contaminated mouthguards in two young football players. Gen Dent 2007; 55:436-440.

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A Properly Fitted Mouthguard will have...

- Adequate thickness in all areas to provide for the reduction of impact forces
- A fit that is retentive and not dislodged upon impact
- Speech considerations equal to the demand of the playing status of the athlete
- A material that meets FDA approval
- Preferably a wearing time of one season of play



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**Academy for Sports Dentistry
32nd Annual Symposium
June 19-21, 2014**

The Westin San Diego
400 West Broadway
San Diego, CA 92101
(888) 627-9033
<http://www.academyforsportsdentistry.org>

Registration is now open! Register today to receive your complimentary registration packet and to secure your spot at this exciting event.

Highlights will include:

- **Guest Lecture:** Dr. Douglas L. Lambert, DDS, FADC, ABAD
- **Presentations:** Dr. Douglas L. Lambert, DDS, FADC, ABAD
- **Workshops:** Dr. Douglas L. Lambert, DDS, FADC, ABAD
- **Breakout Sessions:** Dr. Douglas L. Lambert, DDS, FADC, ABAD
- **Networking:** Dr. Douglas L. Lambert, DDS, FADC, ABAD

Click here to view the new San Diego skyline!

<http://www.westinsandiego.com>



Please visit our website for additional information on this exciting event!



Mark your calendar!
This is a meeting that you won't want to miss!

www.academyforsportsdentistry.org

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Hope to see you
in Chicago
June 19-21!

Let's get started!

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Inventory Checklist



- Maxillary full arch stone model
- DrufoSoft Sports Mouthguard material (3mm ethyl vinyl acetate - EVA)
- DrufoMat Scan Pressure machine stations
- Trimming and polishing stations
 - Electric heat knife
 - Various scissors/lab knives
 - Micromotors
 - Trimming burs
 - Polishing brushes (fine, medium, and coarse)
 - Blazer torch
 - Finishing liquid

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Pressure Thermoformed Athletic Mouthguards

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Heat/Pressure Laminated Custom Made Mouthguards



DrufoMat
Dreve
Raintree Essix



ErkoproS™
Erkodent®
Glidewell Laboratories



BioStar®
Great Lakes Orthodontics.

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Comparison of Conventional Vacuum MG's vs. Pressure Laminated MG's

- Conventional Vacuum Machines have a forming power of up to 1 atmosphere (14.2 lbs/sq in) which cannot be varied.
- Pressure machines have forming power between 1-6 atmospheres which can be varied.



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“State of the Art” Pressure Thermoforming

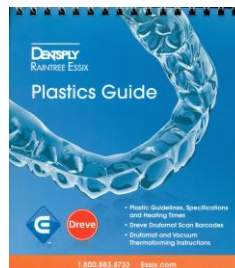
Pressure Thermoforming with the DrufoMat Scan:

- Highest quality dual layered custom athletic mouthguards
- Nightguards/bruxism
- Minor Tooth Movement (MTM) System
- Essix retainers/implant provisionals
- Surgical implant stents
- Bleaching/Fluoride trays



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Essix® Plastics Guide



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Essix® Plastics Guide

The Right Plastic for Each Application

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MG Fabrication Costs

- The true \$64 question!
- Lab costs range from \$60-80 per MG
- What will you charge?
- Purchase of your own machine (Drufomat) will pay for itself with the versatility of the unit: (bruxism appliances, Minor Tooth Movement, provisional stents, bleaching trays, etc...)



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Keys to the Fabrication of a Custom Made Mouthguard

- ✓ Impression
- ✓ Fabrication
- ✓ Trimming and Polishing
- ✓ Placement and Occlusal Equilibration



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Impr Essix

Dentsply/Raintree/Essix/Glenroe



- Improved formula alginate
- Excellent elasticity and tear strength
- Two accurate pours per impression
- Two formulas: Color Change and Extra Fast Set
- Extra Fast Set goes two days without shrinking in a closed plastic bag
- Can be mixed by hand or with the Turbo Max

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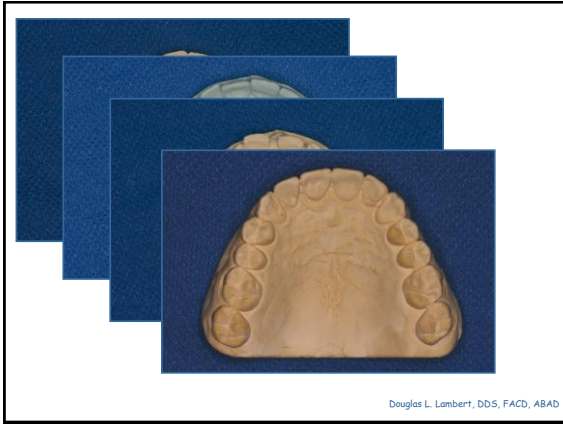
TurboMax



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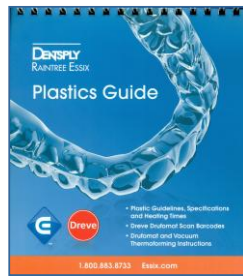


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Drufomat Scan System



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Set up for the Drufomat



90 psi
(145 psi max)

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Drufosoft Plastics Guide



Bar codes make scanning the correct settings a snap!

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Ethyl Vinyl Acetate "Drufosoft Data"

- Softens at 43^o C.
- Tensile Strength = 33mPa
- Tear Strength > 18 N/mm²
- When layering plastics, approximately 40% shrinkage occurs.
- Therefore, 2-3mm layers = 3.5 to 4.0mm thick MG

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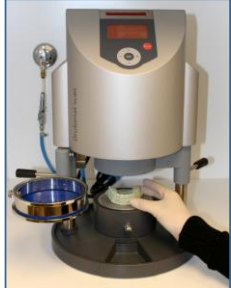
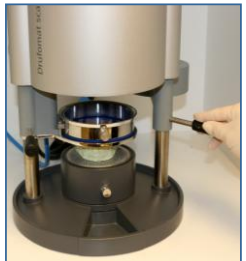



2. Place the tension ring over the two pins and on top of the plastic.



3. Be sure it is a secure fit.

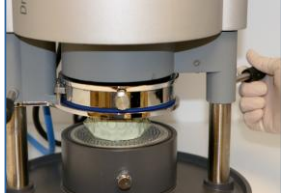


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4. Place the stone cast in the middle of the metal base.

5. Rotate the plate reception with the 3mm plastic blank over the stone cast.

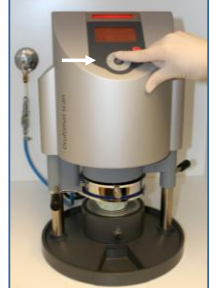

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6. Rotate the heating element over the cast and the plastic.

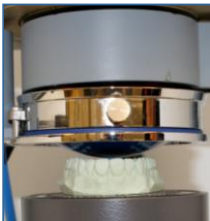

7. Locate the correct bar code for the type, thickness, and layer (1st or 2nd) then scan it into the DrufoSoft Scan. This presets the heating time and cooling time to exact parameters to ensure an excellent result.

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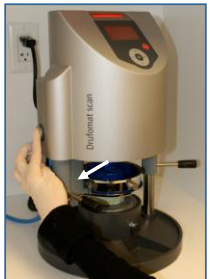
Press the OK button...the heat indicator light will shine red at the base of the DrufoSoft indicating that the heating process has started.

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The plastic will sag as it heats and a long "beep" signals the heating is complete. Rotate the heating element out of the way with your right hand, and press the white button on the left side simultaneously. The pressure chamber closes and the pressure rises. Once it reaches Level 2, release both the button and the lever.

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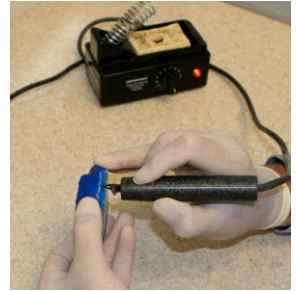
After the cooling phase ends, you hear a short beep. Release the air pressure valves to improve adaptation of the plastic to the model. Press the white button on the left and the chamber lifts away from the first layer of the MG.

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Remove the tension ring from the plastic and pull off the model and first layer.

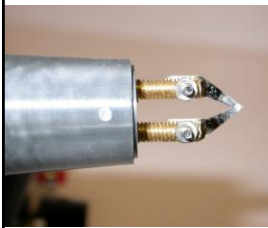
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Trim the borders with the electric heat knife – being sure to follow the vestibular borders and the frenum.

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Athletic Mouthguards



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Athletic Mouthguards



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Athletic Mouthguards

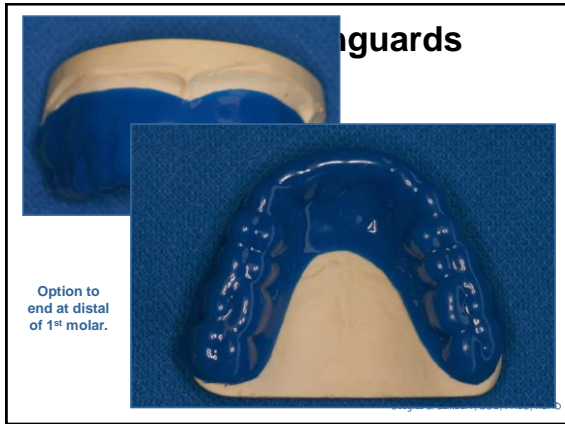


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Athletic Mouthguards





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Adding Logos and Names

- Very easy to customize your mouthguards with a team logo or player's name
- Logo can be a premade sticker or simply a paper replica printed off your home computer
- Paste it into place prior to adding the 2nd layer of the clear 3mm Drufosoft



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Adding a name is just as easy...especially with a label maker (P-Touch Home and Hobby by Brother). The label tape has a peel off backing which makes it a snap to attach to the 1st layer.

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- Add a clear Drufosoft 3mm blank to the plate receptor and secure the tension ring over it.
- Place the cast with the blue 1st layer onto the metal base plate with the distal end close to the rear. This allows for more coverage of the 2nd layer of the plastic to cover the anterior teeth.

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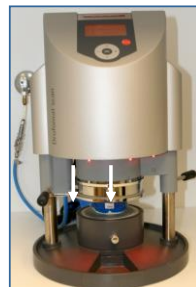

Repeat swinging the plastic and the heating element over the cast.

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Scan the barcode in for the Dufosoft 3mm 2nd layer as it differs in the heating and cooling times from the 1st layer...if you don't scan in the proper barcode, the two layers will not laminate!

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Press the OK button to begin the heating phase. The clear layer will begin to slump. When the beep sounds, repeat the same steps as before by rotating the heating element away and pushing the white button on the left.

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Once the cooling cycle ends, release the air valves again and press and hold the white button, allowing the chamber to lift from the cast. The dual layered laminated mouthguard is completed.

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Remove the cast and mouthguard from the Dufomat.

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Use the heat knife to trim off the excess clear EVA.

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Finishing and Polishing



Lots of options available!

Try the Sports Mouthguard Trimming Bur (MGTB-1) to smooth the borders and thin out the palate.



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Thinning out the palate...

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ScotchBrite polishing wheel



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Final Laminated MG Using the Drufomat



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Let's make one!

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Other uses for the Drufomat

- Nightguards/bruxism appliances
- Whitening/Fluoride trays
- Minor Tooth Movement (MTM)
- Essix retainers
- Provisional splints
- Implant surgical guides
- Many more...



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Bruxism Splint

- Hard Splint (Acrylic)
- Soft Splint (Drufosoft® Pro)
- Combination Hard/Soft Splint (Kombiplast)

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Bruxism Splint

Combination Hard/Soft with Kombiplast

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Plastics Guide

• Plastic Guidelines, Specifications and Healing Times
• Dentsy Duplicated Scan Barcodes
• Duplicates and Vacuum Thermopforming Instructions

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Bruxism Splint

Combination Hard/Soft with Kombiplast

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Kombiplast

• Dual-layer construction, used to create combination hard/soft braces and aligners
• Made with Essix
• How to use any piece

1.800.863.8733 Essix.com

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Bruxism Splint

Combination Hard/Soft with Kombiplast

Pre-laminated Dual Laminate

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Bruxism Splint

Combination Hard/Soft with Kombiplast

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Aligning of Teeth

- Full orthodontics
- Invisalign
- Minor Tooth Movement (MTM)

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Minor Tooth Movement (MTM)

www.essix.com

- Moving a limited number of teeth – usually 1 to 4 teeth – a distance of 2-3mm within the arch
- Requires space within the arch for the teeth to move into
- Done using clear aligners
- Should be performed on patients with permanent teeth only*

* Exception is pediatric crossbite

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Applications for MTM

- Minor esthetic orthodontics
- Positioning for veneer, crown or implants
- Arch alignment for periodontics
- Intrusion to gain implant/bridge space
- Others...



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Types of movement possible

- Bodily/Lateral movement
- Rotation
- Tipping
- Torquing
- Space closure (diastemas/extraction space)
- Crossbite correction
- Intrusion (without moving adjacent teeth)
- Extrusion (without moving adjacent teeth)

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Good Candidates for MTM

- Patient's primary concern is esthetics
- No TMD/TMJ symptoms
- No periodontal concerns
- Adequate space for movement
- Second molars present*
- Motivated patient!



*Exception is pediatric crossbite
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MTM Concept:

Space + Force + Time = Tooth Movement

(Sheridan's First Law of Biomechanics)

Options for Creating Space in the Arch:



Burs



Abrasive Strips



Abrasive Discs

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Options for Creating Space in the Aligner:



Window



Blockout



Thermoplier™
Pliers

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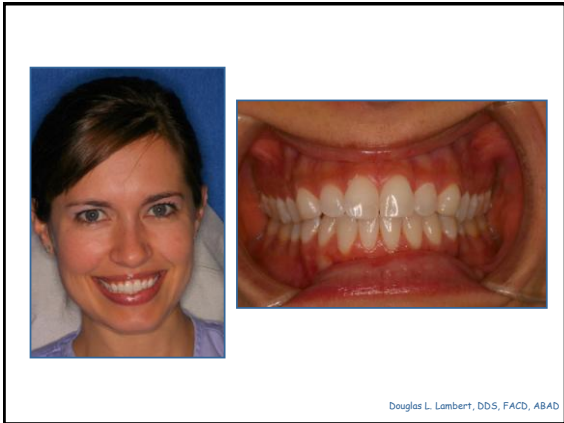
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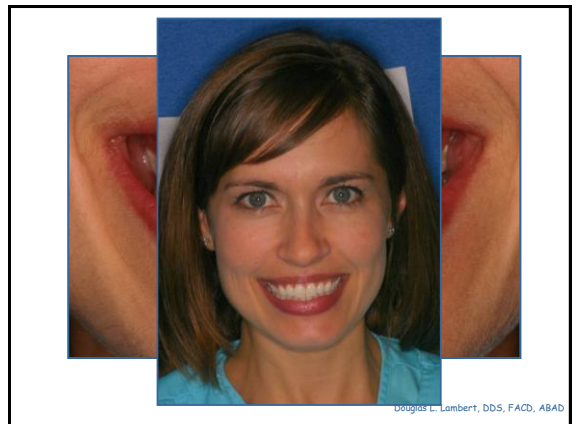


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3 1/2 months

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Questions and clean up...Thanks!



Feel free to contact me at DDSSmile@aol.com

Douglas L. Lambert, DDS, FACD, ABAD