

RESEARCH REPORT**Clinical Orthodontics**J. Nicozisis, DMD, MS¹¹ Princeton Orthodontics - Princeton, NJ**ABSTRACT**

A new micro-invasive technique called Alveocentesis™ developed by university researchers uses the PROPEL® System, an instrument developed by PROPEL Orthodontics, to stimulate cytokine activity thereby, accelerating alveolar bone remodeling. The result is a 50- 60% faster movement when compared to traditional orthodontics alone. PROPEL can be completed chair-side in minutes and does not require any advanced surgical training. Additionally, the Alveocentesis procedure yields very little discomfort to the patient. There is zero recovery time and the patients are able to immediately return to their normal daily routine. The procedure is indicated for approximately 80% of patients receiving orthodontic treatment and can be used in conjunction with any treatment modality including but not limited to TADs, Invisalign®, Sure Smile®, and conventional braces. Unlike other systems, PROPEL is unique in that it can be targeted to specific teeth or quadrants rather than applied to the whole dentition at once in an uncontrolled fashion that may lead to anchorage issues or loose teeth at the conclusion of treatment.

KEYWORDS

Alveocentesis, micro-osteoperforations, bone remodeling, accelerated orthodontics, PROPEL, cytokine expression

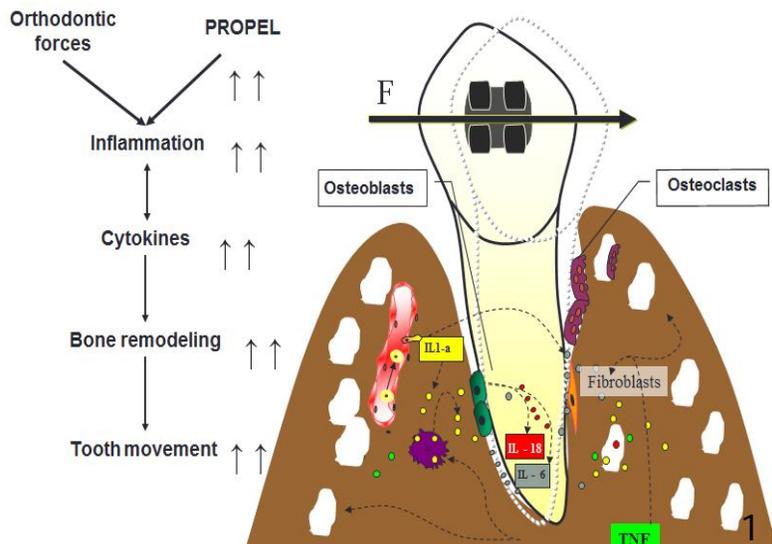
Accelerated Orthodontics With Alveocentesis

INTRODUCTION

Patients' number one concern before starting orthodontic treatment is how long treatment will take. In the past 20 years, new devices and modalities have made the orthodontic process more efficient, but not faster. Many innovations have been introduced to improve bracket design and treatment protocols, however the only effective techniques to increase the speed in which teeth move through alveolar bone involve extensive surgery. The challenge has been how to locally accelerate bone remodeling in a non-invasive manner.

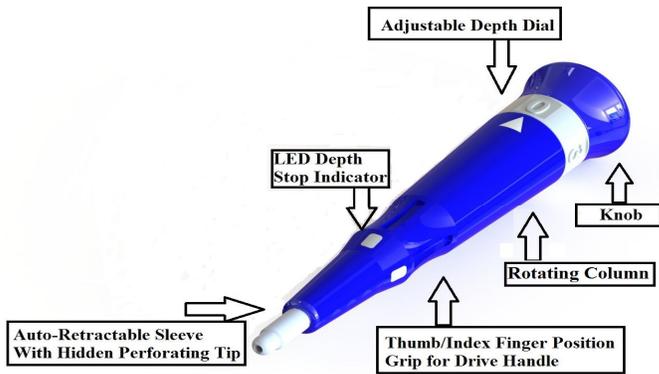
Teixeira et al. has shown that by applying our understanding of tooth movement physiology, we can accelerate bone remodeling using micro-osteoperforations. In particular, by increasing the local levels of cytokine activity around a tooth, the rate of tooth movement during orthodontic therapy can be increased.¹ Increased cytokine activity has been well documented to increase bone remodeling. In animal studies,¹ when micro-osteoperforations were created in the alveolar bone, the cytokine cascade is activated resulting in a marked increase in osteoclast activity. When orthodontic force is applied immediately following micro-osteoperforation, the teeth will move faster and easier through the treated area.²

A new micro-invasive technique called Alveocentesis™ stimulates cytokine activity thereby, accelerating alveolar bone remodeling. This new technique called the PROPEL System has been developed and patented for use as a simple, in-office procedure to stimulate alveolar bone remodeling.



ALVEOCENTESIS USING PROPEL

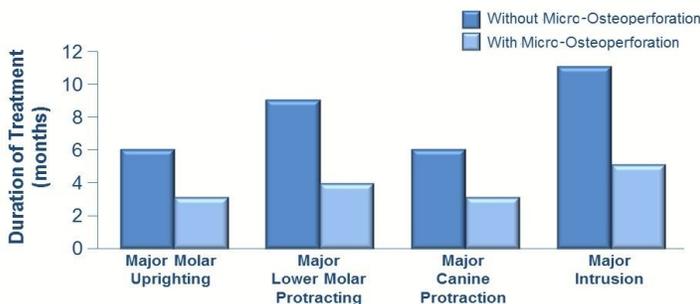
Alveocentesis, performed using the PROPEL® System, is the only micro-invasive option able to accelerate orthodontics. The result is a 50- 60% faster movement than traditional orthodontics alone. PROPEL can be completed chair-side in minutes and does not require any advanced training; therefore, it can be performed by any clinician. Additionally, the Alveocentesis procedure yields very little discomfort to the patient. There is zero recovery time and the patients are able to return to their normal daily routine immediately. The procedure is indicated for approximately 80%³ of patients receiving orthodontic treatment and can be used in conjunction with any treatment modality including but not limited to TADs, Invisalign®, SureSmile®, and conventional braces. Unlike other systems, PROPEL is unique in that it can be targeted to specific teeth or quadrants rather than applied to the whole dentition at once in an uncontrolled fashion that may lead to anchorage issues or loose teeth at the conclusion of treatment.



PROPEL is a breakthrough in dental device engineering. The patented PROPEL System was designed and developed specifically to maximize the alveolar bone remodeling effect while providing a safe and simple device that can be used by any clinician. The treatment edge of the PROPEL device is made of hardened stainless steel and designed to protect the integrity of the bone. PROPEL maintains its sharpness when treating an entire dentition because of an organic electropolishing process⁴. PROPEL profoundly diminishes the effect on soft tissue, in contrast to other currently available rotary instruments.

Micro-Osteoperforation Clinical Data (First 30 patients)

Average Duration of Orthodontic Treatment (based on clinical cases under treatment)



Duration of treatment was reduced by approximately 50% with Osteoperforation

The flutes of the leading edge are at a 30 degree angle to reduce soft tissue resistance and simultaneously provide the clinician with an ergonomic design.

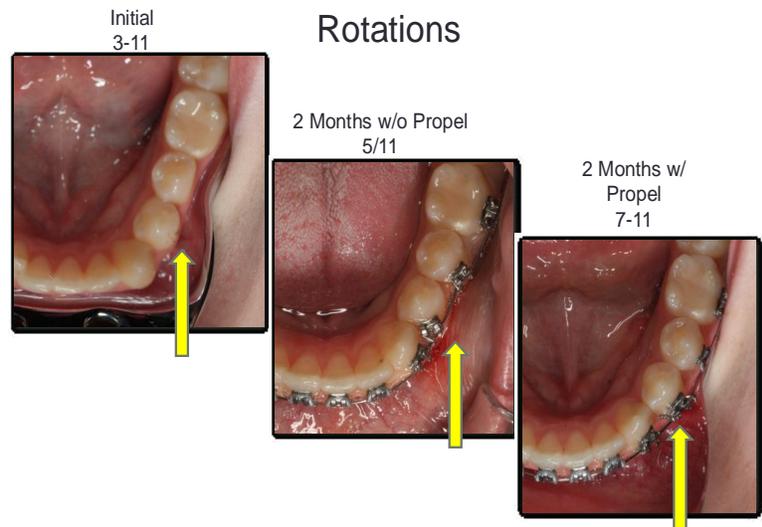
A study at New York University, Department of Orthodontics was conducted with first generation devices that demonstrated an increase in tooth movement by 50-60% or more.

Today, an increasing number of adults are seeking orthodontic treatment to enhance the social, psychological and functional status of their lives. Treatment of these patients is complicated by the fact that the correction of their malocclusion is limited to the dento-alveolar element, since adult patients are no longer growing. With an increase in age, tissues are less biologically active and the ability to adapt diminishes. As a result, tooth movement may not only be more uncomfortable for adults but also occur at a slower rate.

Previous animal studies demonstrate that by delivering Alveocentesis in the bone near the teeth, bone remodeling enables a greater rate of tooth movement.³ Based on the referenced animal studies, it was demonstrated that the usual highly invasive surgical procedures can be simplified and replaced with minimal, shallow, small micro-osteoperforations in alveolar bone without the need for soft tissue flaps, bone grafting or any suturing.³

As with any medical intervention, the longer any orthodontic treatment takes, the higher the possibility for side effects and poor outcomes. By shortening treatment time with PROPEL, patients avoid the pervasive complications of long-term orthodontic treatment. There is less likelihood for decalcifications and root blunting with shorter treatment times⁶.

CLINICAL EXAMPLES OF PROPEL



LL 4 & 5 were treated for eight weeks without PROPEL with little correction. PROPEL was performed and correction was completed in eight weeks.

CLINICAL USES FOR PROPEL

Distalization/
open bite
closure
35 weeks

Initial 10-3-11

Final 6-4-12



Molar Uprighting	Quicker Pre-surgical Orthodontics	Rotation	Intrusion	Crowding
Pre-Esthetic Orthodontics	Accelerated Orthodontics	Avoiding Orthognathic Surgery	Spacing	Eruption

Extrusion
4 Weeks

5-11

6-11



Significant leveling and aligning of the maxillary anterior segment.

PROPEL's clinical advantages apply to all types of dental and orthodontic challenges. Orthodontists can use PROPEL to accelerate correction of any type of spacing regardless of the origin. Tooth size discrepancy issues are an obvious use but tooth loss is often a challenge that can now easily be overcome. Long term tooth loss leads to atrophy of the ridge, extrusion of the opposing tooth, and often molar tipping. PROPEL induces and enhances bone metabolism providing an elegant chair-side solution to long standing orthodontic challenges.

A rapidly growing segment of the orthodontic market is adult relapse cases. This population of patients chief complaint is often lower anterior crowding. Alveocentesis is uniquely able to quickly address this issue and help this population of patients achieve their desired results quickly without the need for extended treatment.

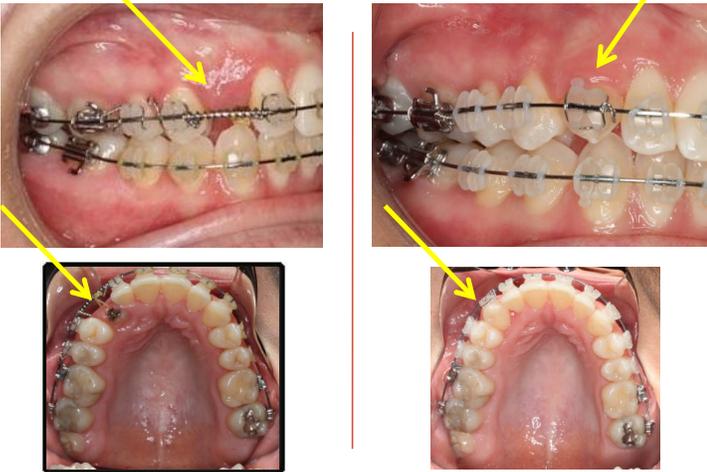
Besides the orthodontic and tooth position issues, accelerating treatment will give adults and teens with busy schedules the option of orthodontic care. PROPEL makes orthodontic treatment a realistic option for many that up until now would not consider.

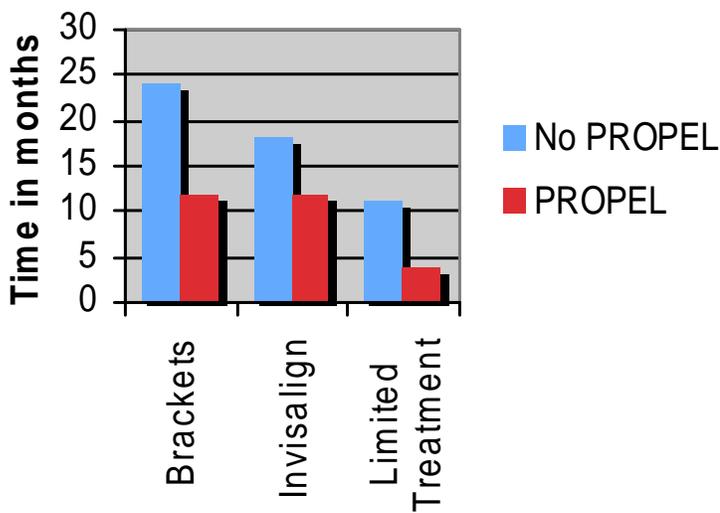
The micro-osteoperforations created by PROPEL harnesses the body's own biology to create a cytokine effect that induces bone remodeling and allows teeth to be moved into the clinically desired position in a more predictable and faster manner. The induction of the cytokine cascade is modulated and controlled by the design of the device itself. Basic bone biology research, animal studies, and controlled clinical trials have demonstrated the safety and efficacy of the PROPEL treatment. In fact, the results of both animal and clinical studies have demonstrated that the PROPEL System using the Alveocentesis technique decreases orthodontic treatment time by 50-60% or more in combination with any type of orthodontic force.⁷

Exposure/Extrusion
16 Weeks

2-7-12

5-30-12





There are multiple benefits of using the PROPEL System in practice including reduced treatment time, greater patient satisfaction, and increased efficiency.

Reducing treatment time for patients has been an industry goal due to patient and orthodontist demand. Besides the cost of treatment, patients take time away from work and school to attend multiple appointments. These appointments incur significant indirect costs. The average patient spends an additional \$654 travelling to and from their appointments during a two year treatment⁵. Reducing the number of office visits with faster tooth movement will save both time and money for patients.

Orthodontists are looking for ways to efficiently treat more patients, thereby allowing their practices to grow with an increase in new starts each year. Finishing cases faster and with more predictability will allow orthodontists to meet the increasing population's demand for orthodontics. PROPEL can help bridge the gap between this shortage and the increasing demand that is predicted.⁸

Adult patients exhibit a greater incidence of mutilated dentitions with missing teeth. As these adult patients seek prosthodontics treatment, a cost effective alternative to implants often involves orthodontic closure of the edentulous region. Adult patients do not want orthodontic treatment for an extended period of time. PROPEL can significantly shorten the duration of treatment, making orthodontics a more acceptable option. The PROPEL System provides a safe and effective means to accelerate orthodontic treatment in a targeted fashion rather than other systems that are applied in an uncontrolled manner on every tooth in the mouth. PROPEL can be used by any clinician in a wide array of cases to enhance patient and clinician satisfaction with more predictable outcomes.

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