

EDITOR

Robert G. Keim, DDS, EdD, PhD

SENIOR EDITOR

Eugene L. Gottlieb, DDS

ASSOCIATE EDITORS

Birte Melsen, DDS, DO (Aarhus, Denmark)

Ravindra Nanda, BDS, MDS, PhD
(Farmington, CT)

John J. Sheridan, DDS, MSD (Jacksonville, FL)

Peter M. Sinclair, DDS, MSD (Los Angeles, CA)

Bjorn U. Zachrisson, DDS, MSD, PhD
(Oslo, Norway)

TECHNOLOGY EDITOR

W. Ronald Redmond, DDS, MS (San
Clemente, CA)

CONTRIBUTING EDITORS

R.G. Alexander, DDS, MSD (Arlington, TX)

Jeff Berger, BDS, DO (Windsor, Canada)

S. Jay Bowman, DMD, MSD (Portage, MI)

Robert L. Boyd, DDS, MEd (San Francisco, CA)

Vittorio Cacciafesta, DDS, MSC, PhD (Milan,
Italy)

José Carrière, DDS, MD, PhD (Barcelona,
Spain)

Jorge Fastlicht, DDS, MS (Mexico City, Mexico)

John W. Graham, DDS, MD (Litchfield Park, AZ)

Robert S. Haeger, DDS, MS (Kent, WA)

Warren Hamula, DDS, MSD (Monument, CO)

Masatada Koga, DDS, PhD (Tokyo, Japan)

Neal D. Kravitz, DMD, MS (South Riding, VA)

Björn Ludwig, DMD, MSD (Traben-Trarbach,
Germany)

James Mah, DDS, MS, DMS (Los Angeles, CA)

Richard P. McLaughlin, DDS (San Diego, CA)

James A. McNamara, DDS, PhD (Ann Arbor, MI)

Elliott M. Moskowitz, DDS, MS (New York, NY)

Jonathan Sandler, BDS, MSC, FDS RCPS,
MOrth RCS (Chesterfield, United Kingdom)

Sarah C. Shoaf, DDS, MEd, MS (Winston-
Salem, NC)

Georges L.S. Skinazi, DDS, DSO, DCD
(Paris, France)

Michael L. Swartz, DDS (Encino, CA)

Flavio Uribe, DDS, MDS (Farmington, CT)

EXECUTIVE EDITOR

David S. Vogels III

MANAGING EDITOR

Wendy L. Osterman

EDITORIAL ASSISTANT

Heidi Reese

BUSINESS MANAGER

Lynn M. Bollinger

CIRCULATION MANAGER

Carol S. Varsos

ART DIRECTOR

Irina Lef

Address all communications to *Journal of Clinical Orthodontics*, 1828 Pearl St., Boulder, CO 80302. Phone: (303) 443-1720; fax: (303) 443-9356; e-mail: info@jco-online.com. See our website at www.jco-online.com.

THE EDITOR'S CORNER

Managing the Vertical Dimension

Controlling the vertical dimension during comprehensive treatment has always been one of the most challenging aspects of orthodontic practice. Since the point of force application on the crown of the tooth is vertically removed from the center of resistance and center of rotation, any forces applied directly to the crown to effect mesiodistal tooth movement are inevitably accompanied by vertical force vectors that would result in extrusive tooth movement if left unchecked. Sometimes this kind of side effect is desirable—for instance, in deep-bite cases where bite opening is a treatment goal—but in most cases, the extraneous vertical force vectors are more likely to result in deleterious side effects such as an iatrogenic anterior open bite.

Extrusion of posterior dental segments is relatively easy, given the lack of anatomical impediments. Still, we have all experienced cases in which we just can't get that last bit of bite opening needed to achieve an ideal vertical overbite. Moreover, while it may be simple to open a bite biomechanically, keeping it open during retention is another story altogether.

Intrusion of the posterior teeth can also work to the orthodontist's advantage, especially when the treatment plan involves closing an anterior open bite. Intrusion of dental segments is considerably more difficult than extrusion, however, because the teeth are embedded in a bony matrix that counteracts and dissipates intrusive forces.

Various biomechanical strategies have been employed for full-arch management of the vertical dimension. Techniques for opening the bite generally involve leveling the curve of Spee with archwires, anterior bite plates, cervical-pull Kloehn-type headgear, or a combination of these devices. Extreme measures might include the application of bite plates or bite blocks to specific segments, usually anterior teeth, to achieve posterior disclusion while interarch vertical elastics are worn to forcibly erupt the other teeth. Strategies for closing the vertical dimension call for the use of vertical-pull chin cups or the extraction of second or third molars. Posterior bite blocks

are remarkably effective at intruding posterior teeth; this can be done sequentially, progressing from the second molars to the first molars and premolars, by selective addition and removal of acrylic to the occlusal bite-block surfaces. Although the technique is not often seen in the United States, it is still taught in several orthodontic programs, most notably at the Eastman Dental Center of the University of Rochester, New York. Anyone who doubts the efficacy of this treatment modality should take a look at some of Eastman's finished high-angle cases.

Managing the relative vertical positions of individual teeth is actually more difficult than managing the vertical dimension of the entire arch, primarily due to the phenomenon of reciprocal tooth movement. When we try to erupt or intrude individual teeth, it becomes a battle of anchorage values. For example, if we want to intrude a single first molar using archwires—unless we are very careful and more than a little biomechanically creative—we will probably extrude the second molar and premolar on either side of the target tooth.

All of us have been faced with the situation in which an upper second molar has supraerupted into an edentulous space in the lower arch. When the patient finally decides to have the occlusion rehabilitated by the general dentist or prosthodontist, the orthodontist has the task of intruding that overerupted second molar. Approaches that have been employed over the years include bending various loops into the archwires, placing a

removable bite-block appliance to be worn like a partial denture in the lower arch, and referring the patient for endodontic treatment followed by full-crown restoration of the second molar. Orthodontists had hoped that skeletal anchorage would be the answer; unfortunately, the quality of bone in the second-molar region is rarely adequate to support temporary anchorage devices (TADs) for the length of time needed to intrude overerupted second molars.

Our current issue of JCO contains two reports dealing with vertical control. In one, Drs. Flavio Uribe, Nandakumar Janakiraman, Amine Fattal, Soumya Padala, and Ravindra Nanda of the University of Connecticut employ a unique combination of TADs and cantilevered segmental archwires to achieve the near-perfect intrusion of a second molar while completely avoiding untoward side effects. In the other, Drs. V. Ashwin Kumar, A.V. Arun, and S. Aravind Kumar of the Department of Orthodontics, Saveetha Dental College and Hospital, Chennai, India, offer a new solution to an old vertical problem: extruding a tooth that has been fractured below the gum line far enough to allow placement of a full-crown restoration.

Difficulties in managing the vertical dimension of either complete arches or individual teeth will always be a part of orthodontic practice. Combining new technologies with the creative use of old mechanical standbys may help us avoid frustration.

RGK