management of arch length deficiencies (thesis). Seattle:University of Washington, 1978.
12. O'Reilly WC. Proportional change of hard and soft tissue profiles as a result of orthodontic treatment (thesis). Seattle:University of Washington, 1957.
13. Drobocky OB, Smith RJ. Changes in facial profile during orthodontic treatment with extraction of four first premolars. Am J Orthod Dentofac Orthop 1989;95(3):220-230.
14. Rudee DA, Proportional profile changes concurrent with orthodontic therapy. Am J Orthod 1964;50(6):421-433.
15. Bloom LA. Perioral profile changes in orthodontic treatment. Am J Orthod 1961;47(5):371-379.
16. Koch R, Gonzales A, Witt E. Profile and soft tissue changes during and after orthodontic treatment. Eur J Orthod 1979;1:193-199.
17. Garner LD. Soft tissue changes concurrent with orthodontic tooth movement. Am J Orthod 1974;66(4):367-376.
18. Bravo LA. Soft tissue facial profile changes after ortho treatment with four premolars extracted. Angle Orthod 1994;64(1):31-42.
19. Anderson JP, Joondeph DR, Turpin DL. A cephalometric study of profile changes in orthodontically treated cases ten years out of retention. Angle Orthod 1973;43(3):324-336.
20. Yogosawa F. Predicting soft tissue profile changes concurrent with orthodontic treatment. Angle Orthod 1990; 60(3):199-206.
21. Kuyl MH, Verbeeck RMH, Dermaut LR. The integumental profile: A reflection of the underlying skeletal configuration? Am J Orthod Dentofac Orthop 1994;106:597-604.
22. Branoff RS. A roentgenographic cephalometric study of changes in the soft tissue profile related to orthodontic treatment. Am J Orthod 1971;60(3): 305-306.
23. Wylie WL. The mandibular incisor—its role in facial esthetics. Angle Orthod 1955;25:32-41.
24. Subtelny JD. A longitudinal study of soft tissue facial structures and their profilecharacteristics, defined in relation to underlying skeletal structures. Am J Orthod 1959;45(7):481-507.
25. Burstone CJ. Liip posture and its significance in treatment planning. Am J Orthod 1967;53:262-284.
26. Seely DM. An evaluation of profile changes in individuals treated with serial extraction versus late extraction of first premolars (thesis). Seattle: University of Washington, 1980.
27. Melsen B. The cranial base. Acta Odont Scand 1974;32(suppl 62).
28. Doppel DM, DAmon WM, Joondeph DR, Little RM. An investigation of maxillary superimposition techniques using metallic implants. Am J Orthod Dentofac Orthop 1994;105:161-168.
29. Bjork A. Variations in the growth pattern of the human mandible: Longitudinal radiographic study by the implant method. J Dent Res 1963; 42 (suppl 1):400-411.
30. Angle EH. Malocclusions of the teeth. Seventh ed. Philadelphia: SS White Dental Manufacturing Co, 1907.
31. Graber TM. Serial extraction: A continuous diagnostic and decisional process. Am J Orthod 1971;60(6):541-575.
32. Stoner MM, Lindquist JT, Vorhies JM, Hanes RA, Hapak FM, Haynes ET. A cephalometric evaluation of fifty-seven consecutive cases treated by Dr. Charles Tweed. Angle Orthod 1956; 26(2):68-98.
33. Hershey HG. Incisor retraction and subsequent profile change in postadolescent females. Am J Orthod 1972;61:45-54.
34. Inouye SY. A serial study of soft tissue profiles of individuals with excellent occlusions (thesis). Seattle: University of Washington, 1957.
35. Schiedeman GB, Bell WH, Legan HL, Finn RA, Reisch JS. Cephalometric analysis of dentofacial normals. Am J Orthod 1980;78(4):404-420.
36. Sinclair PM. Dentofacial maturation of untreated normals. Am J Orthod 1985;88:146-156.
37. Bowker WD, Meredith HV. A metric analysis of the facial profile. Angle Orthod 1959;29:149-160.
38. Hambleton RS. The soft tissue covering of the skeletal face as related to orthodontic problems. Am J Orthod 1964;50(6):405-420.
39. Hasstedt CW. A serial cephalometric study of the effects of orthodontic treatment on incisal overbite and the soft tissue profile. 1956.
40. Roos N. Soft tissue profile changes in Class II treatment. Am J Orthod 1977;72:165-175.
41. Ricketts RM. Planning treatment on the basis of the facial pattern and an estimate of its growth. Angle Orthod 1957;27:14-37.
42. Skinazi GLS, Lindauer SJ, Issacson RJ. Chin, nose, and lips: Normal ratios in yound men and women. Am J Orthod Dentofac Orthop 1994;106:518-523.

Commentary: Comparison of soft tissue profile changes in serial extraction and late premolar extraction

Robert J. Isaacson, DDS, MSD, PhD

Worms et al. called the soft tissue the ultimate compensator in the facial profile (Angle Orthod 1976;45:1). They coined this phrase in the context of orthognathic surgical treatment. This article, which examines the effect of dental extractions on the facial profile, shows that the soft tissue profile does not distinguish between surgical and orthodontic changes in its surrounding environment.

The hypothesis investigated was that the profiles of patients treated with late premolar extraction do not differ significantly from the profiles of patients whose dentition underwent a period of drifting following serial extraction. The idea is based on the tacit belief that differences in tooth retraction will lead to differences in the profile.

Since the study supported the hypothesis of no profile differences, and it is well done with robust sized groups, the notion of any clinically meaningful difference in profiles resulting from the different treatment regimens is probably spurious. The important caveat is the real difference in the treatment regimens between the groups.

In group A, the serial extraction, no treatment group, and group B, the serial extraction with orthodontic treatment group, the timing of acquisition of the radiographs is clearly stated, but the exact developmental timing of the extractions is not given. When were the different teeth extracted? How long was the dentition free to drift? Would more time between extractions and records have allowed more tooth movement? If all

management of arch length deficiencies (thesis). Seattle:University of Washington, 1978.
12. O'Reilly WC. Proportional change of hard and soft tissue profiles as a result of orthodontic treatment (thesis). Seattle:University of Washington, 1957.
13. Drobocky OB, Smith RJ. Changes in facial profile during orthodontic treatment with extraction of four first premolars. Am J Orthod Dentofac Orthop 1989;95(3):220-230.
14. Rudee DA, Proportional profile changes concurrent with orthodontic therapy. Am J Orthod 1964;50(6):421-433.
15. Bloom LA. Perioral profile changes in orthodontic treatment. Am J Orthod 1961;47(5):371-379.
16. Koch R, Gonzales A, Witt E. Profile and soft tissue changes during and after orthodontic treatment. Eur J Orthod 1979;1:193-199.
17. Garner LD. Soft tissue changes concurrent with orthodontic tooth movement. Am J Orthod 1974;66(4):367-376.
18. Bravo LA. Soft tissue facial profile changes after ortho treatment with four premolars extracted. Angle Orthod 1994;64(1):31-42.
19. Anderson JP, Joondeph DR, Turpin DL. A cephalometric study of profile changes in orthodontically treated cases ten years out of retention. Angle Orthod 1973;43(3):324-336.
20. Yogosawa F. Predicting soft tissue profile changes concurrent with orthodontic treatment. Angle Orthod 1990; 60(3):199-206.
21. Kuyl MH, Verbeeck RMH, Dermaut LR. The integumental profile: A reflection of the underlying skeletal configuration? Am J Orthod Dentofac Orthop 1994;106:597-604.
22. Branoff RS. A roentgenographic cephalometric study of changes in the soft tissue profile related to orthodontic treatment. Am J Orthod 1971;60(3): 305-306.
23. Wylie WL. The mandibular incisor—its role in facial esthetics. Angle Orthod 1955;25:32-41.
24. Subtelny JD. A longitudinal study of soft tissue facial structures and their profilecharacteristics, defined in relation to underlying skeletal structures. Am J Orthod 1959;45(7):481-507.
25. Burstone CJ. Liip posture and its significance in treatment planning. Am J Orthod 1967;53:262-284.
26. Seely DM. An evaluation of profile changes in individuals treated with serial extraction versus late extraction of first premolars (thesis). Seattle: University of Washington, 1980.
27. Melsen B. The cranial base. Acta Odont Scand 1974;32(suppl 62).
28. Doppel DM, DAmon WM, Joondeph DR, Little RM. An investigation of maxillary superimposition techniques using metallic implants. Am J Orthod Dentofac Orthop 1994;105:161-168.
29. Bjork A. Variations in the growth pattern of the human mandible: Longitudinal radiographic study by the implant method. J Dent Res 1963; 42 (suppl 1):400-411.
30. Angle EH. Malocclusions of the teeth. Seventh ed. Philadelphia: SS White Dental Manufacturing Co, 1907.
31. Graber TM. Serial extraction: A continuous diagnostic and decisional process. Am J Orthod 1971;60(6):541-575.
32. Stoner MM, Lindquist JT, Vorhies JM, Hanes RA, Hapak FM, Haynes ET. A cephalometric evaluation of fifty-seven consecutive cases treated by Dr. Charles Tweed. Angle Orthod 1956; 26(2):68-98.
33. Hershey HG. Incisor retraction and subsequent profile change in postadolescent females. Am J Orthod 1972;61:45-54.
34. Inouye SY. A serial study of soft tissue profiles of individuals with excellent occlusions (thesis). Seattle: University of Washington, 1957.
35. Schiedeman GB, Bell WH, Legan HL, Finn RA, Reisch JS. Cephalometric analysis of dentofacial normals. Am J Orthod 1980;78(4):404-420.
36. Sinclair PM. Dentofacial maturation of untreated normals. Am J Orthod 1985;88:146-156.
37. Bowker WD, Meredith HV. A metric analysis of the facial profile. Angle Orthod 1959;29:149-160.
38. Hambleton RS. The soft tissue covering of the skeletal face as related to orthodontic problems. Am J Orthod 1964;50(6):405-420.
39. Hasstedt CW. A serial cephalometric study of the effects of orthodontic treatment on incisal overbite and the soft tissue profile. 1956.
40. Roos N. Soft tissue profile changes in Class II treatment. Am J Orthod 1977;72:165-175.
41. Ricketts RM. Planning treatment on the basis of the facial pattern and an estimate of its growth. Angle Orthod 1957;27:14-37.
42. Skinazi GLS, Lindauer SJ, Issacson RJ. Chin, nose, and lips: Normal ratios in yound men and women. Am J Orthod Dentofac Orthop 1994;106:518-523.

Commentary: Comparison of soft tissue profile changes in serial extraction and late premolar extraction

Robert J. Isaacson, DDS, MSD, PhD

Worms et al. called the soft tissue the ultimate compensator in the facial profile (Angle Orthod 1976;45:1). They coined this phrase in the context of orthognathic surgical treatment. This article, which examines the effect of dental extractions on the facial profile, shows that the soft tissue profile does not distinguish between surgical and orthodontic changes in its surrounding environment.

The hypothesis investigated was that the profiles of patients treated with late premolar extraction do not differ significantly from the profiles of patients whose dentition underwent a period of drifting following serial extraction. The idea is based on the tacit belief that differences in tooth retraction will lead to differences in the profile.

Since the study supported the hypothesis of no profile differences, and it is well done with robust sized groups, the notion of any clinically meaningful difference in profiles resulting from the different treatment regimens is probably spurious. The important caveat is the real difference in the treatment regimens between the groups.

In group A, the serial extraction, no treatment group, and group B, the serial extraction with orthodontic treatment group, the timing of acquisition of the radiographs is clearly stated, but the exact developmental timing of the extractions is not given. When were the different teeth extracted? How long was the dentition free to drift? Would more time between extractions and records have allowed more tooth movement? If all

the premolars were extracted near the same point in development, this could give very different results from serial extraction practiced with much earlier removal of premolars. This, of course, raises the old question of the definition of serial extraction. The term has become almost generic, used to describe many different courses of action. Often we begin serial extraction when crowded lateral incisors emerge, and the incisors seem to align, accompanied by lingual movement. It is interesting to see that this study found that the lower incisors were more lingually placed in the late extraction group. Could this be because patients in the late extraction group were less severely crowded and so deferred from the serial extraction process? Can we be assured that the anchorage preservation of the orthodontic treatment was equally careful and equally needed?

This report is important because it clarifies two issues. One is the finding that incisor retraction does not *a priori* lead to reductions in facial profiles. The second is that the apparent lingual movement of incisors following extraction of primary canines does not necessarily lead to greater lingual positioning of these teeth as compared with the later removal of premolars to relieve crowding.

I offer plaudits to the authors. The study was well done and my most severe criticism is that it does not tell me everything I want to know on the subject. It does, however, carefully address a well-defined question and uses good samples and sophisticated statistics.

R. J. Isaacson, professor and chairman, Department of Orthodontics, VCU/MCV School of Dentistry, P. O. Box 980566, Richmond, VA 23298-0566

E-mail: rjisaacson@gems.vcu.edu