LETTERS FROM OUR READERS

To: Editor, *The Angle Orthodontist*

RE: The Form of The Human Arch

I have 2 questions concerning the article ''The Form of the Human Arch,'' published in *Angle Orthod.* 1998;68:29–36. Please let me know the answers.

If you substitute the mean depths and widths of dental arches into equation 2, the resulting formulas will be different from those printed on page 33 of the original article. For example, substituting the mean depth and width of Class II maxillary dental arch ($D = 39.5$ & $W = 51.1$) into equation 2, you will have:

$$Y = 119.740[x/51.5 + 1/2]^{0.8.1} \quad [1/2 - x/51.5]^{0.8},$$

which is different from the fourth formula on page 33. What is the reason?

The mean depths and widths of all mandibular dental arches are greater than those of their respective maxillary ones. For example, the mean depth and width of Class I mandibular dental arches ($D = 47.4$ & $W = 59.3$) are greater than those of Class I maxillary dental arches ($D = 40.7$ & $W = 53.0$). How is it possible, knowing that, at least in Class I cases, maxillary dental arch usually covers mandibular 1?

Hassan Noroozi, DDS, MSc

Author's response:

Thank you for your comments regarding our recent article titled ''The Human Arch Form.'' I do want you to know that I, and I believe the profession, should be grateful for your astute observations. It is also nice to know that someone actually reads the articles! Your observations are valid. The mandibular and maxillary arch headings in Tables 1, 2, and 3 are reversed (maxillary arch should be substituted for mandibular arch, and vice versa). The constants were also mixed up as a result. Somehow, these errors escaped detection in reviewing the original manuscripts and the galley proofs. Revised Tables 1, 2, and 3, Figures 4 through 7, and the mean equations of the Class I, II, and III dental arch shapes are attached.

$$Y = 143.6\left[\frac{X}{59.3} + \frac{1}{2}\right]^{0.8}\left[\frac{1}{2} - \frac{X}{59.3}\right]^{0.8},$$

Class I Maxillary Arch

$$Y = 123.4\left[\frac{X}{53.0} + \frac{1}{2}\right]^{0.8}\left[\frac{1}{2} - \frac{X}{53.0}\right]^{0.8},$$

Class I Mandibular Arch

$$Y = 134.6\left[\frac{X}{57.0} + \frac{1}{2}\right]^{0.8}\left[\frac{1}{2} - \frac{X}{57.0}\right]^{0.8},$$

Class II Maxillary Arch

$$Y = 119.7\left[\frac{X}{51.5} + \frac{1}{2}\right]^{0.8}\left[\frac{1}{2} - \frac{X}{51.5}\right]^{0.8},$$

Class II Mandibular Arch

$$Y = 133.7\left[\frac{X}{61.4} + \frac{1}{2}\right]^{0.8}\left[\frac{1}{2} - \frac{X}{61.4}\right]^{0.8},$$

Class III Maxillary Arch

$$Y = 120.9\left[\frac{X}{58.1} + \frac{1}{2}\right]^{0.8}\left[\frac{1}{2} - \frac{X}{58.1}\right]^{0.8},$$

Class III Mandibular Arch

Revision of equations originally appearing in *Angle Orthod.* 1998;68:33.

Dr Noroozi, I am indebted to you for your observations. It is important that the data be presented correctly. Best regards.

Dr Stanley Braun

TABLE 1. Revision of Table 1 Originally Appearing in *Angle Orthod.* 1998;68:32

	Class I—Maxillary Arch				
	Measured Values		Curve Fit Values		Correlation Coefficient
Cast	Depth, mm	Width, mm	Depth, mm	Width, mm	r
1a	40.0	59.3	41.3	60.1	0.98
2a	43.4	61.4	45.2	61.5	0.99
3a	45.9	57.7	47.9	58.8	0.98
4a	42.0	56.8	45.2	56.9	0.99
5a	44.8	53.3	50.1	56.2	0.95
6a	46.9	54.3	49.8	54.6	0.99
7a	44.2	60.2	47.8	60.9	0.99
8a	42.7	58.0	46.3	59.5	0.99
9a	51.3	63.8	52.9	64.6	0.99
10a	48.6	58.7	52.7	60.8	0.97
11a	39.5	56.7	42.3	57.5	0.99
12a	47.5	59.0	49.0	62.9	0.95
13a	46.0	59.0	49.1	60.0	0.99
14a	42.5	56.9	42.6	56.9	0.99
15a	45.5	58.1	48.7	58.4	0.99
Average	44.7	58.2	47.4	59.3	0.98
SD	3.2	2.6	3.5	2.7	0.01
Maximum	51.3	63.8	52.9	64.6	0.99
Minimum	39.5	53.3	42.3	54.6	0.95

	Class I—Mandibular Arch				
	Measured Values		Curve Fit Values		Correlation Coefficient
Cast	Depth, mm	Width, mm	Depth, mm	Width, mm	r
1b	35.2	52.2	35.3	53.2	0.99
2b	40.3	57.8	40.1	57.8	0.99
3b	40.7	50.1	42.7	50.2	0.99
4b	36.8	49.4	39.1	49.4	0.98
5b	38.8	52.5	40.0	53.3	0.96
6b	41.2	49.0	40.9	50.1	0.97
7b	38.8	55.0	40.6	55.1	0.99
8b	35.4	51.3	37.4	51.6	0.99
9b	44.5	58.4	44.8	58.5	0.98
10b	42.9	46.4	44.5	50.6	0.87
11b	35.1	51.0	36.1	51.0	0.98
12b	42.3	57.7	43.5	59.1	0.99
13b	41.1	51.1	44.2	51.5	0.98
14b	37.3	50.7	36.7	50.8	0.98
15b	42.4	51.7	44.0	52.2	0.98
Average	39.5	52.3	40.7	53.0	0.97
SD	3.0	3.5	3.2	3.2	0.03
Maximum	44.5	58.4	44.8	59.1	0.99
Minimum	35.1	46.4	35.3	49.4	0.87

TABLE 2. Revision of Table 2 Originally Appearing in *Angle Orthod.* 1998;68:33

	Class II—Maxillary Arch				
	Measured Values		Curve Fit Values		Correlation Coefficient
Cast	Depth, mm	Width, mm	Depth, mm	Width, mm	r
16a	44.4	59.1	46.0	59.1	0.98
17a	47.9	59.9	44.8	62.3	0.97
18a	39.8	55.4	38.6	59.3	0.95
19a	47.7	57.5	48.0	57.9	0.99
20a	44.4	57.0	43.7	57.1	0.99
21a	44.8	56.2	44.1	56.2	0.99
22a	46.4	56.0	47.3	56.1	0.99
23a	38.4	56.1	41.3	56.3	0.99
24a	42.7	58.2	41.3	58.3	0.98
25a	46.9	52.1	45.3	53.1	0.99
26a	39.5	51.8	40.2	52.3	0.99
27a	45.7	57.5	48.8	58.8	0.99
28a	41.7	55.0	43.1	55.1	0.97
29a	38.4	58.0	42.7	59.2	0.98
30a	48.6	52.8	50.1	53.9	0.98
31a	45.9	57.2	47.6	57.3	0.99
Average	44.0	56.2	44.4	57.0	0.98
SD	3.5	2.4	3.3	2.7	0.01
Maximum	48.6	59.9	50.1	62.3	0.99
Minimum	38.4	51.8	38.6	52.3	0.95

	Class II—Mandibular Arch				
	Measured Values		Curve Fit Values		Correlation Coefficient
Cast	Depth, mm	Width, mm	Depth, mm	Width, mm	r
16b	41.6	54.2	41.9	54.2	0.99
17b	36.9	55.7	38.9	55.8	0.99
18b	39.4	48.9	40.9	49.3	0.99
19b	39.2	51.6	42.1	52.5	0.99
20b	36.8	51.7	39.6	52.1	0.99
21b	39.9	50.6	39.9	50.7	0.99
22b	38.9	50.2	40.6	50.3	0.99
23b	38.1	49.1	41.0	49.3	0.99
24b	34.4	52.7	34.1	52.8	0.99
25b	39.8	46.6	37.2	55.3	0.86
26b	34.6	47.5	33.5	47.6	0.99
27b	39.6	50.6	41.7	50.6	0.99
28b	37.6	47.6	40.6	48.5	0.98
29b	37.5	51.3	39.6	54.1	0.97
30b	40.2	49.0	40.7	49.1	0.97
31b	39.1	51.2	41.1	51.2	0.99
Average	38.4	50.5	39.5	51.5	0.98
SD	2.0	2.5	2.6	2.6	0.03
Maximum	41.6	55.7	42.1	55.8	0.99
Minimum	34.4	46.6	33.5	47.6	0.86

TABLE 3. Revision of Table 3 Originally Appearing in *Angle Orthod.* 1998;68:34

	Class III—Maxillary Arch				
	Measured Values		Curve Fit Values		Correlation Coefficient
Cast	Depth, mm	Width, mm	Depth, mm	Width, mm	r
32a	38.5	53.1	39.6	53.9	0.99
33a	43.0	52.6	44.4	55.5	0.95
34a	43.4	60.1	44.4	61.9	0.99
35a	47.1	65.5	49.3	67.0	0.99
36a	37.6	59.8	40.1	59.9	0.97
37a	40.8	62.0	43.7	63.9	0.98
38a	43.1	65.8	43.0	65.9	0.98
39a	41.5	60.6	43.7	61.3	0.99
40a	45.9	63.6	48.8	63.6	0.98
Average	42.3	60.3	44.1	61.4	0.98
SD	3.1	4.8	3.3	4.4	0.01
Maximum	47.1	65.8	49.3	67.0	0.99
Minimum	37.6	52.6	39.6	53.9	0.95

	Class III—Mandibular Arch				
	Measured Values		Curve Fit Values		Correlation Coefficient
Cast	Depth, mm	Width, mm	Depth, mm	Width, mm	r
32b	36.2	51.6	38.2	52.0	0.99
33b	35.9	54.5	36.9	55.9	0.98
34b	38.9	56.9	40.3	57.7	0.98
35b	41.4	58.0	44.2	58.9	0.97
36b	35.5	58.1	37.3	59.9	0.97
37b	37.5	60.7	37.1	60.7	0.98
38b	41.7	61.7	39.9	61.8	0.99
39b	38.4	55.4	40.7	57.1	0.97
40b	42.5	58.5	44.4	58.9	0.99
Average	38.7	57.3	39.9	58.1	0.98
SD	2.7	3.1	2.9	2.9	0.01
Maximum	42.5	61.7	44.4	61.8	0.99
Minimum	35.5	51.6	36.9	52.0	0.97
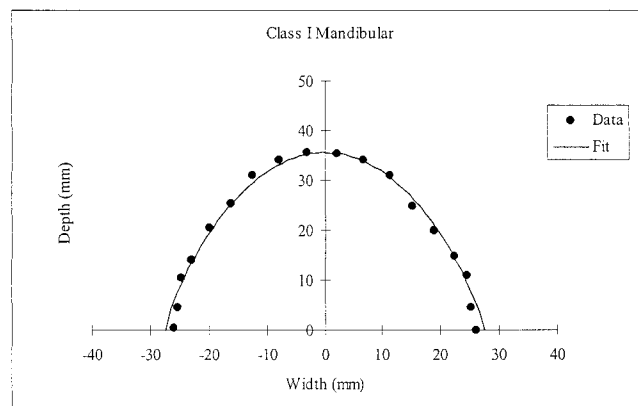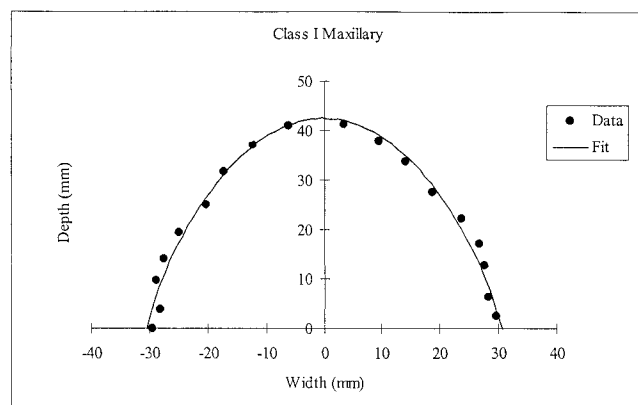
FIGURE 1. Revision of Figure 4 originally appearing in *Angle Orthod.* 1998;68:31.
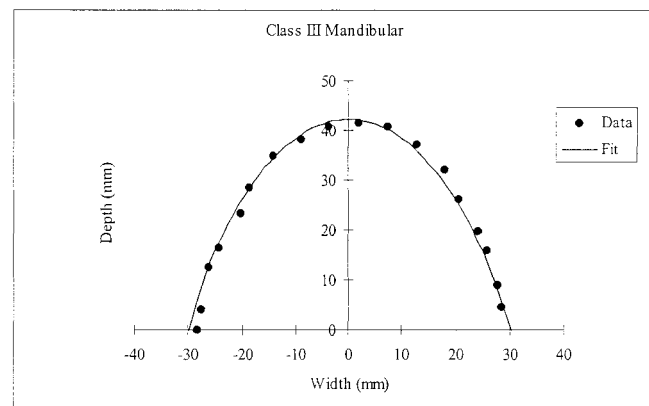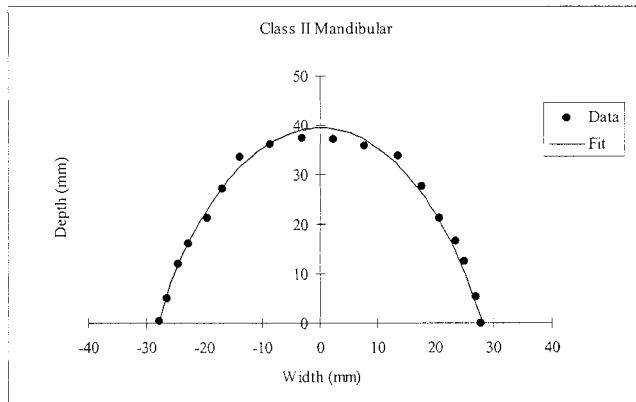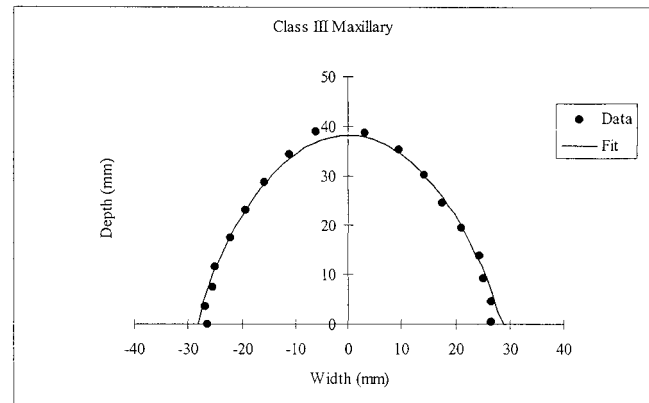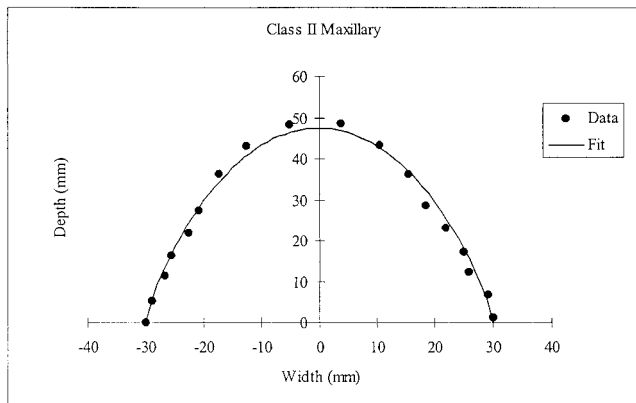
FIGURE 2. Revision of Figure 5 originally appearing in *Angle Orthod.* 1998;68:31.

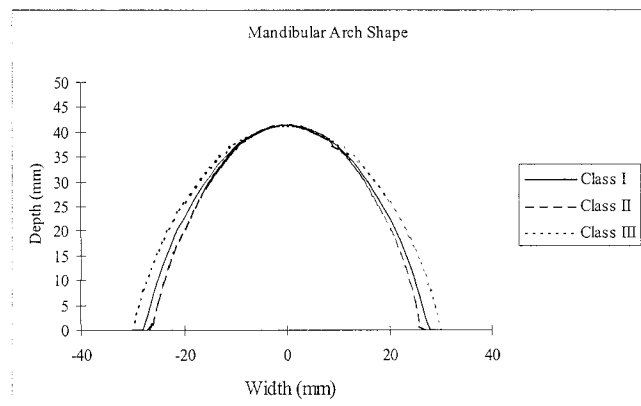**FIGURE 3.** Revision of Figure 6 originally appearing in *Angle Orthod.* 1998;68:31.
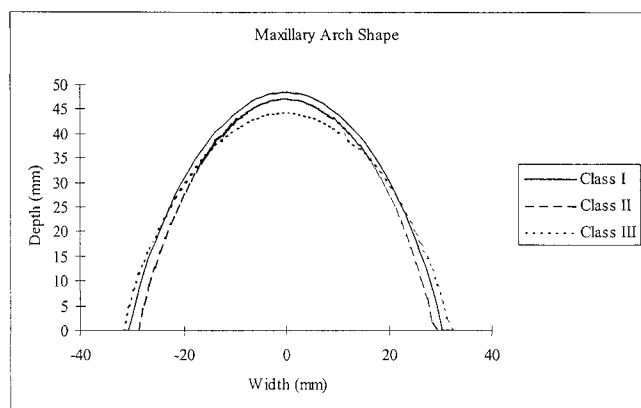
Maxillary Arch Shape

Mandibular Arch Shape

FIGURE 4. Revision of Figure 7 originally appearing in *Angle Orthod.* 1998;68:31.