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ORTHODONTIC MARKETING THROUGH SOCIAL MEDIA NETWORKS: THE
PATIENT AND PRACTITIONER'S PERSPECTIVE

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Science in Dentistry at Virginia Commonwealth University.

by

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ABSTRACT

ORTHODONTIC MARKETING THROUGH SOCIAL MEDIA NETWORKS: THE PATIENT AND PRACTITIONER'S PERSPECTIVE

by Kristin L. Nelson, D.D.S.

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Dentistry at Virginia Commonwealth University.
Virginia Commonwealth University, 2014
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Objective: The aim of this study was to (1) assess the orthodontic patient and practitioner use and preferences of social media, and (2) to investigate the potential benefit of social media in marketing and communication strategies in orthodontic practices.

Material and Methods: A survey was distributed to all participants, which included orthodontists from the American Association of Orthodontists (AAO) and patients/parents from the VCU Orthodontic Clinic and Private Practices throughout the United States. The participants were asked to answer questions related to their use of social media as well as their perceptions of usage of social media in the orthodontic practice.

Results: 76% of orthodontists, 71% of the VCU Practice participants and 89% of the Private Practice participants used social media, with the highest preference for Facebook among all of the participants. Orthodontist's posed information more often in

the morning and afternoon (40% and 56%, respectively) and patients used social media mainly in the evening (76%). The most commonly used marketing strategies in the orthodontic practice were social media and a practice website (76% and 59%, respectively). Social media and practice websites were positively related to new patient starts ($P=0.0376$, $P=0.0035$, respectively). Newspapers were negatively related to new patient starts ($P=0.0003$).

Conclusions: Social media use was more common in females and younger adults and facebook was the most commonly used social media site among all of the participants. Orthodontists posted information on social media websites mainly in the morning and afternoon, while patients spend more time on social media sites in the evening. Newspaper advertisements were negatively related to new patient starts. Facebook and Twitter were positively related to new patient starts when used as a marketing and communication tool in the orthodontic practice.

INTRODUCTION

The Internet was originally developed in 1982 as a researcher's communication tool, and since 1994, its primary purpose has been expanded to serve the general public.¹ The Internet is constantly evolving and in recent years, both healthcare professionals and lay people have used it as a source of health-related information. In 2011, the third most common activity online was looking for healthcare information², and in 2012, 72% of adult internet users sought medical information online.³

The use of the Internet is rapidly changing and the introduction of social media has revolutionized the way people interact through the social web. Social media is defined as "online technologies and practices that people use to share opinions, insights, experiences and perspectives with each other."⁴ Websites such as Facebook, Twitter, and MySpace allow individuals to share information about any topic at any time, and wikis and blogs promote ongoing information sharing. Video websites such as YouTube provide a platform where individuals can share their digital videos instantly with anyone in the world.

People have discovered and developed new ways to communicate with each other or within groups of individuals using the social web. Social media websites allow individuals to have a dialogue with their friends, family, and other individuals from anywhere in the world. As a result, millions of people have engaged in social media websites. Since its creation in 2004, Facebook has grown into a worldwide network of nearly one billion subscribers.¹ Recent research has shown that social media is gaining importance and influence in the medical field.⁵⁻⁸ Advocates of the use of social media in healthcare suggest that these sites allow practitioners to connect and communicate with their patient population. This was confirmed in a recent study by Fisher et al, who

reported that 83% of the patients used social media for communication and 56% of those patients wanted their healthcare providers to use social media for communication.⁹ In addition, a systematic review of the existing literature on social media in healthcare reported that 72% of the studies examined supported the use of social media in healthcare, primarily as a communication tool.¹⁰

Social media is also used in the field of Dentistry. A survey of general dentists in the United States revealed that 52% of dental practices used social media primarily for marketing and communication purposes.¹¹ Although research on social media in the orthodontic literature is limited, Jorgensen explains the importance of using social media in the orthodontic practice to communicate with their patients, establish a reputation, and attract new patients.¹² Knosel et al revealed that there was a wide variety of information about orthodontics available on YouTube, and that orthodontists needed to recognize the importance of YouTube and similar social media websites in the opinion-forming process of their orthodontic patients.¹³ In addition, a recent qualitative analysis of orthodontic-related posts on Twitter revealed that orthodontic patients used social media sites such as Twitter to convey positive and negative opinions about braces.¹⁴

Although social media networks were originally created for personal use, they are now being effectively employed by businesses of all sizes to advertise their services and to communicate with current and prospective customers. Over the years, marketing has been practiced by advertising via traditional means of media such as television, billboards, pamphlets, radio, phone books and interpersonal communication. Compared to traditional advertising, social media marketing is a cost-effective and more efficient

solution for promoting services and products,¹⁵ especially since more customers are spending time online.¹⁶

According to a recent report, Facebook was the number one social marketing tool for companies with 100+ employees, followed by Twitter.¹⁷ In a study of consumer behavior, 56% of the consumers expressed that they were more likely to recommend a brand after becoming a fan on Facebook. Additionally, 51% of the consumers declared that they were more likely to buy a product after becoming a fan on Facebook.¹⁸ These encouraging numbers have urged companies to concentrate on social media marketing. The benefits of social media marketing are seen not only in businesses, but also in healthcare. Over the years, social media marketing has taken a surprisingly significant role in healthcare businesses and in the doctor-patient relationship.

Researchers in the dental field have suggested that social media marketing is the future of dental marketing. Social media marketing is a cost effective mean(s) to reach hundreds of potential new patients who seek a practitioner's expertise and services.¹⁹⁻²¹ Social media is also an important and powerful reputation management tool. Edwards et al reported that the top factor in the final selection of an orthodontist was a good reputation.²² In addition, according to a recent report on the perceived quality of care among healthcare professionals, provider reputation (66%) ranked higher than both cost of treatment (28%) and a doctor's recommendation (40%).²³ Patients may rate their overall satisfaction with a provider online, but these scores do not capture critical details about patients' actual experiences. Using social media, patients can share their experiences with a broader and more attentive audience through a wide variety of word-

of-mouth messaging techniques. Social media tools can be used to share positive patient experiences as well as respond to negative ones.²⁴

The benefits of social media are undeniable, however its use in health care does present some challenges. As more patients and practitioners participate in social media, potential ethical issues rise. The most prevalent barrier regarding the use of social media in health care is the concern about compromised privacy and confidentiality.²⁵ In a recent study, 48% of the participants who preferred not to use social media for healthcare stated that the primary reason was due to privacy and confidentiality. The next most common response was concerns about a lack of personal benefit.⁹

Although social media use in obtaining healthcare related information has been described,²⁶⁻²⁹ the literature on its use in the specific field of orthodontics is limited. The aim of this study was to assess the orthodontic patient and practitioner use of and preferences regarding social media, and to investigate the potential benefit of social media in marketing and communication strategies of orthodontic practices. The null hypothesis is that there are no differences in the usage or perception of social media use in the orthodontic practice among orthodontists and patients. The results will contribute to the limited amount of orthodontic research on this topic and serve as a baseline to compare trends with future research. The findings will provide relevant information for orthodontists who want to integrate social media into their practices.

MATERIALS AND METHODS

The Virginia Commonwealth University (VCU) granted institutional review board approval to conduct the study (IRB#: HM15040).

Participants

The study participants included orthodontists and patients. A survey related to the use of social media in the orthodontic practice was distributed to all participants in the study. Participation was voluntary and the responses from the subjects were entirely confidential.

For the orthodontist population, the American Association of Orthodontics (AAO) Partnership in Research was contacted and a web-based link to the survey was distributed to 500 randomly selected orthodontists within the United States.

The patient population included patients 18 years old or older and parents of patients that were younger than 18 from private practices throughout the United States as well as from the VCU Orthodontic Clinic. The patient population that is described in this study as Private Practice participants and VCU Practice participants included both parents and patients. For participants recruited from private practices, an email was sent out to all orthodontists in the Medical College of Virginia (MCV) Orthodontic Foundation, and a set of paper-based surveys (30) were sent to each office that agreed to participate in order for them to distribute the surveys to their patients. Participants at the VCU Orthodontic Clinic were requested to complete a web-based survey. The participants could take the survey at any time during treatment.

Survey

The survey included the definition of social media along with many examples of social media websites. It gathered demographic information for all participants. The survey consisted of questions related to the participant's usage habits as well as their perceptions of social media usage in the orthodontic practice. Participants who did not use social media were asked to list their reasons for not using social media.

Statistical methods

Descriptive statistics were calculated to describe the subjects (means or percents, as appropriate). The groups were compared on individual factors using a chi-square tests. When more than one factor was considered, logistic regression was used. Comparisons between survey items were performed using repeated measures logistic regression. The impact of marketing practices on new patient starts was analyzed using multiple regression. Group differences were indicated using Tukey's HSD multiple comparison procedure. All calculations were done with SAS software (JMP pro version 10, Cary NC).

RESULTS

There are seven main sections of results for this study. In the first section, the demographic characteristics of the three participant groups are described and compared. The second section describes social media use and the relationship with demographics is illustrated. The use of different social media platforms among the three groups is summarized in the third section. The fourth section describes why, how often, and when parents/patients and orthodontists use social media. The various types of content posted on social media are described and compared in the fifth section. The sixth section lists the reasons why the participants do not use social media. Finally, social media marketing considerations in the orthodontic practice are described in the seventh section.

Description of subjects

A total of 189 orthodontists and 437 patients/parents (188 Private Practice participants and 249 VCU Practice participants) responded to similar surveys between July 1, 2013 and October 1, 2013. Response rates for orthodontists and the patient/parent groups were 38% and 87%, respectively. Table 1 shows that orthodontists were older than the patient/parent groups (46 years old versus 40 years old, $P < .0001$) and that the two patient/parent groups did not have a significantly different age (39.5 versus 40.7). There were significantly more male (71%) than female orthodontists (29%, $P < .0001$) and orthodontists were most commonly white (87%), followed by Asian (6%), African American (3%), and American Indian (1%). The percentage of males in Private Practice participants (12%) was less than in VCU Practice participants (28%, $P < .0001$). The two patient/parent groups had significantly

different family income means (VCU Practice participants mean=\$59,658 SD=\$37,663 versus Private Practice participants mean=\$89,723 SD=\$36,621, $P < .0001$). Most of the VCU Practice and Private Practice participants were parents of patients (70.9%) and there were fewer parents of patients in VCU Practice participants (66.3%) than in the Private Practice participants (77.1%, $P=0.0126$).

Table 1. Description of Survey Participants: Orthodontists, VCU Practice Participants, and Private Practice Participants

Characteristics	Orthodontists		VCU Practice		Private Practice		P
	%	(n)	%	(n)	%	(n)	
Age (years)							<.0001
18 to 24	0	(0)	13	(31)	10	(18)	
25 to 34	12	(22)	19	(46)	18	(34)	
35 to 44	32	(60)	33	(80)	35	(65)	
45 to 54	33	(61)	30	(72)	28	(53)	
55 to 64	22	(41)	5	(13)	9	(17)	
65 to 74	1	(2)	1	(2)	1	(1)	
75 to 84	1	(1)	0	(0)	0	(0)	
Gender							<.0001
Female	29	(55)	72	(175)	88	(165)	
Male	71	(132)	28	(67)	12	(22)	
Race¹							
White	87	(165)	61	(152)	90	(169)	<.0001
Black or African American	3	(6)	25	(63)	6	(12)	<.0001
American Indian/ Alaska Native	1	(1)	2	(4)	1	(2)	0.5447
Asian	6	(11)	2	(6)	3	(6)	0.1734
Pacific Islander	1	(2)	0	(0)	1	(1)	0.1837
Other	4	(8)	8	(21)	0	(0)	<.0001
Ethnicity							
Hispanic or Latino	2	(2)	8	(32)	8	(32)	0.0119
Not Hispanic or Latino	98	(125)	92	(390)	92	(390)	
Family income (per year)							<.0001
Less than \$25,000			21	(48)	5	(10)	
\$25,000 to \$49,999			31	(72)	14	(26)	
\$50,000 to \$99,999			31	(73)	35	(65)	
\$100,000 or more			18	(41)	46	(87)	

¹ The race groups were “check all that apply” and so the percentages will not add to 100.

Social media use

The participants were asked about their usage of social media. The results showed that 76% of the orthodontist group, 71% of the VCU Practice group and 89% of the Private Practice group used social media. There were significant differences between all of the groups initially ($P < .0001$). However, social media use was associated

with age ($P < .0001$), gender ($P=0.0147$), but not race or ethnicity ($P>0.15$). In order to accurately compare the groups on social media use, a multiple logistic regression was used after adjusting for age and gender. In this analysis, age remained a strong predictor ($P<.0001$) and the differences between the groups depended upon the age group that the participant was in ($P=0.0036$). The age groups were defined as follows: 18-24 years old, 25-34 years old, 35-44 years old, 45-54 years old, and 55-64 years old.

The results of the multiple regression analysis are best demonstrated in Figure 1, where the decrease in social media use in older adults was evident as well as the consistently higher use among females. In the younger age groups (18-24 and 25-34), social media use was significantly higher in Private Practice participants than in either VCU Practice participants or in orthodontists (Table 2). Although orthodontists' use in the 25-34 age groups was nominally higher than VCU Practice participants, the two groups were not significantly different. However, this pattern changed after age 35. Private Practice participants and orthodontists' use was significantly higher than VCU Practice Participants in ages 35-44 and 45-54. After age 55, social media use was low and there was no significant difference between the three groups.

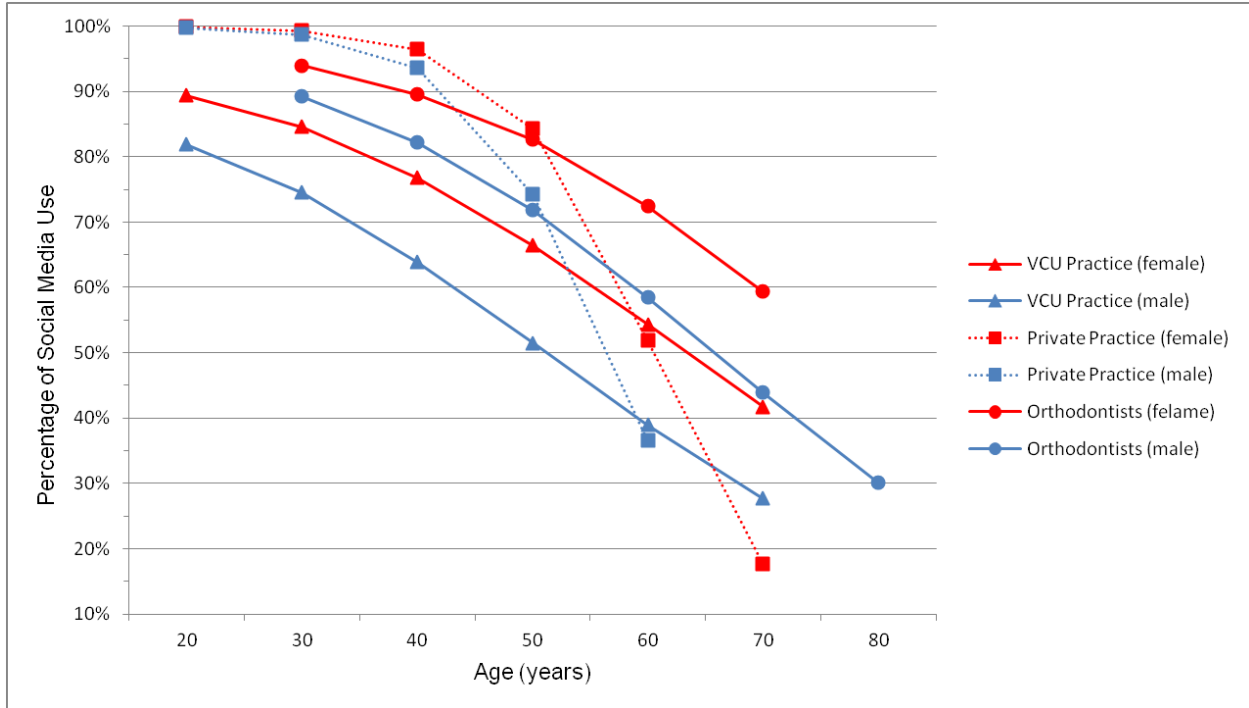


Figure 1. Social Media Use by Age, Sex, and Group

Table 2. Social Media Use by Age, Sex, and Group

Groups	N	Female	Male	*
<u>Age 18 to 24</u>				
VCU patients	31	89.4	81.9	^B
Private patients	18	99.8	99.6	^A
Orthodontists	22	93.9	89.2	^B
<u>Age 25 to 34</u>				
VCU patients	46	84.6	74.5	^B
Private patients	34	99.3	98.6	^A
Orthodontists	60	89.6	82.1	^B
<u>Age 35 to 44</u>				
VCU patients	80	76.7	63.8	^B
Private patients	65	96.4	93.5	^A
Orthodontists	61	82.6	71.8	^A
<u>Age 45 to 54</u>				
VCU patients	72	66.4	51.4	^B
Private patients	53	84.3	74.2	^A
Orthodontists	41	72.5	58.5	^A
<u>Age 55 to 64</u>				
VCU patients	13	54.3	38.9	^A
Private patients	17	51.8	36.5	^A
Orthodontists	2	59.3	43.8	^A

* within each age, groups with a different superscript are significantly different

Different social media platforms

Participants were asked to list which social media websites they use and their usage varied by both media and participant groups. The percentage usage was summarized for each group and media type in Table 3 and Figure 2. The significance of group differences (orthodontists, VCU Practice, Private Practice) for each media platform was shown by the p-value in the right hand column of Table 3. Media platforms sharing the same superscript were not significantly different. When comparing the different media platforms among orthodontists, Facebook (74.6%) was the most

commonly used social media platform, followed by YouTube (29.1%). The most common social media site among VCU Practice participants was also Facebook (63.9%). The next most common platform used by VCU Practice participants was YouTube (32.9%), Instagram (26.5%), and Google+ (23.7%) and there were no significant differences between these platforms. Private Practice participants also used Facebook (80.3%) more than any other site, followed by YouTube (49.5%) and Pinterest (49.5%).

Although a similar pattern was seen within each subject group, there were significant differences between the subject groups. Facebook use was significantly different across the three subject groups ($P=0.0031$). Private Practice participants' use of Facebook was significantly higher than VCU Practice use (80% vs. 64%) but orthodontist use (75%) was not significantly different than either of the other two groups. YouTube use ($P=0.0002$) among Private Practice participants (37%) was higher than both orthodontists and VCU Practice participants (29% and 33%, respectively). These latter two percentages were not statistically different. There were no significant differences between the groups on Twitter use, Google+ use, or Blogger use.

Table 3. Overall Percentage of Social Media Usage by Groups

Media	Percentage				Overall	Groups ¹ P-value
	Orthodontists	VCU patients	Private patients			
Facebook	74.6 ^A	63.9 ^A	80.3 ^A	74.0 ^A	0.0031	
Twitter	24.9 ^{BC}	17.3 ^D	23.4 ^C	21.8 ^{CD}	0.1756	
Google+	23.3 ^{BC}	23.7 ^B	29.8 ^C	25.7 ^C	0.2725	
YouTube	29.1 ^B	32.9 ^B	49.5 ^B	37.2 ^B	0.0002	
Linkedin	18.0 ^{BC}	12.0 ^D	25.5 ^C	18.0 ^D	0.0036	
Pinterest	6.9 ^D	16.9 ^D	49.5 ^B	19.7 ^{CD}	<.0001	
Instagram	17.5 ^C	26.5 ^B	30.3 ^C	24.7 ^{CD}	0.0125	
Blogger	4.2 ^D	2.0 ^E	3.2 ^D	3.1 ^E	0.4310	
Wikia ¹	0.0	2.8	1.6			
Other ¹	1.1	3.2	0.5			

¹ Percentage use was compared by Groups and Media using repeated-measures logistic regression. Wikia and other were not included in the analysis because of their near-zero percentages. Media platforms sharing the same superscript were not significantly different.

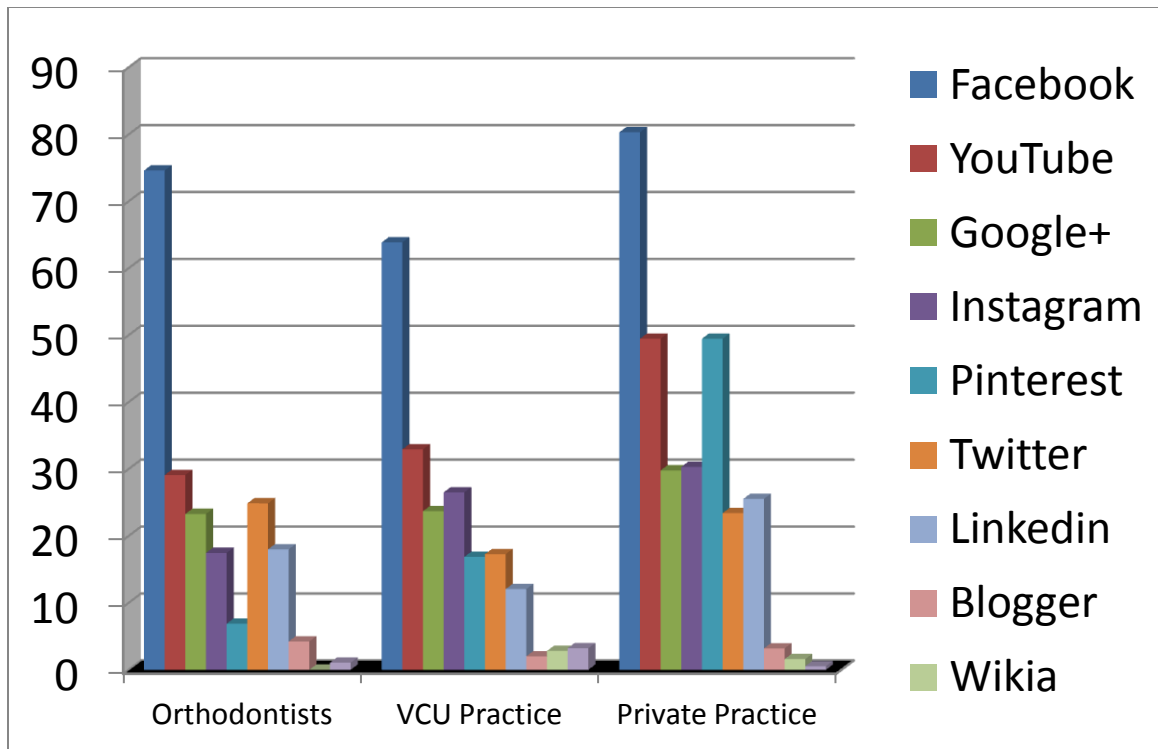


Figure 2. Overall Percentage of Social Media Usage by Groups

Why, how often, and when used

Private Practice and VCU Practice participants used social media in a variety of ways and their reasons are summarized in Table 4. Most commonly, they used social media to communicate with friends and family (>91%). There was no difference between VCU Practice participants and Private Practice participants in how often they used social media to communicate with friends and family, to communicate with healthcare providers, or to find information about healthcare providers. The second most common reason Private Practice and VCU Practice participants used social media was to search for products (≥47%). Private Practice participants used social media to search for products more than those in VCU practice (61% vs. 47%, P=0.0070).

Daily use of social media websites was also summarized in Table 4. Using the mid-point of the range of each of the daily use categories as a numeric value, VCU Practice participants had a higher daily use (mean = 49.5 minutes per day, SD = 40.0) than Private Practice participants (39.3 minutes per day, SD = 31.8, P = 0.0099).

Table 4. Why and How often: Patients

	VCU Practice		Private Practice		P-value
	%	(n)	%	(n)	
To communicate with friends and family	91	(160)	93	(155)	0.5186
To communicate with my healthcare provider	12	(21)	11	(18)	0.7365
To search for products	47	(82)	61	(102)	0.0070
To find out more about my healthcare provider	18	(32)	27	(45)	0.0515
Other	12	(21)	30	(50)	<.0001
How often do you use social media website(s)?					0.0099
1 hour per week	15	(26)	13	(21)	
2-4 hours per week	18	(32)	18	(30)	
10-30 minutes per day	18	(32)	29	(49)	
30-60 minutes per day	17	(29)	21	(35)	
60-90 minutes per day	14	(25)	11	(19)	
90-120 minutes per day	7	(13)	2	(4)	
More than 2 hours per day	10	(18)	5	(9)	

When orthodontists were asked why they used social media websites in their orthodontic practice, the largest percentage did it because most of their patients use social media websites (62%, see Table 5). The next most common response was because social media is useful in communicating with their patients (48%).

Orthodontists were also asked how often they post information or pictures on their social media websites and the results showed that most posted information on their social media websites 2-3 times per week (31%, see Table 5), followed by 1 time per day (23%).

The times of the day when orthodontist's posted information and when patients used social media did vary (see Table 6). Orthodontist's posed information more often

in the morning and afternoon (40%, 56%, respectively) and patients used social media mainly in the evening (76%).

Table 5. Why and how often: Orthodontists

	Orthodontists	
	%	(n)
Social media brings more patients into my practice	37	(60)
Most of my patients use social media websites	70	(114)
I know other practitioners are successful using social media	38	(63)
My marketing expenditures have decreased while using social media	17	(28)
Social media is useful in communicating with my patients	48	(79)
Other	4	(6)
How often?		
2-3 times per day	9	(12)
1 time per day	23	(32)
2-3 times per week	31	(43)
1 time per week	20	(28)
1-2 times per month	14	(19)
Not sure	3	(4)

Table 6. When used

When used?	Orthodontists		VCU Practice		Private Practice		P-value
	%	(n)	%	(n)	%	(n)	
Morning (8 a.m.-12 p.m.)	40	(76)	30	(75)	44	(83)	0.0028
Afternoon (12 p.m.- 5 p.m.)	56	(71)	28	(69)	33	(62)	0.0008
Evening (after 5 p.m.)	23	(29)	55	(138)	76	(142)	<.0001

Various types of content posted

Various types of content may be posted on social media websites. Orthodontists were asked what content they posted and the two patient/parent groups were asked what content they considered appropriate and interesting. The percentage of orthodontists that posted a specific type of content was compared to the percentage of

Private Practice and VCU Practice participants that considered a specific type of information appropriate and interesting (see Figure 3 and Table 7).

There was a statistically significant difference and negative association between the number of patient's pictures the orthodontists posted (58%) and the number of VCU Practice (27% appropriate, 25% interesting) and Private Practice (47% appropriate, 42% interesting) participants that considered pictures of patient's appropriate and interesting. A statistically significant difference was found between the percentage of orthodontists that posted pictures of staff (50%) and the percentage of VCU Practice participants (34% appropriate, 29% interesting) that viewed pictures of staff appropriate and interesting but no difference was found with Private Practice participants (58% appropriate, 48% interesting). The percentage of orthodontist's that posted pictures of the themselves (36%) was statistically higher than the percentage of VCU Practice participants that viewed this information as interesting (25%) but there were no statistically significant differences between the percentage that considered it appropriate (29%). However, a significantly higher percentage of Private Practice participants considered pictures of the orthodontist appropriate (56%) and interesting (50%) than the percentage of orthodontists that posted pictures of themselves (36%).

A significantly lower percentage of orthodontists posted information explaining new products and procedures (38%) than the percentage of VCU Practice (57% appropriate, 55% interesting) and Private Practice participants (77% appropriate, 74% interesting) that considered explaining new products and procedures interesting and appropriate. Significantly more orthodontists posted information regarding contests in

the practice (63%) than the number of VCU Practice participants that thought contests in the practice was appropriate (31%) and interesting (31%).

There was a statistically higher percentage of Private Practice participants that considered updates about the office (86% appropriate, 80% interesting), involvement in charitable programs (73% appropriate, 65% interesting), and involvement in community service events (71% appropriate, 63% interesting) as appropriate and interesting than the percentage of orthodontists that posted this type of information (51%, 47%, 48%, respectively). However, the percentage of VCU Practice participants that viewed involvement in charitable programs (39% appropriate, 38% interesting) and community service events (41% appropriate, 36% interesting) as appropriate and interesting was less than the percentage of orthodontists that posted this type of information (47%, 48%).

Table 7. Types of content

Pictures of patients and exciting events in their lives				
Group	Mean	95% CI		p-value
A-Ortho post	57.7	50.5	64.5	
B-VCU appropriate	26.9	21.8	32.8	<.0001
C-Private appropriate	46.8	39.8	54.0	0.0347
D-VCU interesting	24.5	19.6	30.2	<.0001
E-Private interesting	42.0	35.2	49.2	0.0024
Pictures of staff and exciting events in their lives				
Group	Mean	95% CI		p-value
A-Ortho post	49.7	42.7	56.8	
B-VCU appropriate	34.1	28.5	40.3	0.0011
C-Private appropriate	57.5	50.3	64.3	0.1333
D-VCU interesting	29.3	24.0	35.3	<.0001
E-Private interesting	48.4	41.3	55.5	0.7960

Pictures of the orthodontist and exciting events in his/her life

Group	Mean	95% CI		p-value
A-Ortho post	35.5	29.0	42.5	
B-VCU appropriate	28.5	23.3	34.4	0.1247
C-Private appropriate	55.9	48.7	62.8	<.0001
D-VCU interesting	25.3	20.3	31.1	0.0231
E-Private interesting	50.5	43.4	57.6	0.0031

Explaining new products and procedures

Group	Mean	95% CI		p-value
A-Ortho post	37.6	31.0	44.7	
B-VCU appropriate	57.0	50.8	63.0	<.0001
C-Private appropriate	77.1	70.6	82.6	<.0001
D-VCU interesting	55.0	48.8	61.1	0.0003
E-Private interesting	73.9	67.2	79.7	<.0001

Contests for patients in the practice

Group	Mean	95% CI		p-value
A-Ortho post	63.0	55.9	69.6	
B-VCU appropriate	30.9	25.5	36.9	<.0001
C-Private appropriate	66.0	58.9	72.4	0.5436
D-VCU interesting	30.9	25.5	36.9	<.0001
E-Private interesting	57.5	50.3	64.3	0.2739

Updates about the office such as hours, events, etc.

Group	Mean	95% CI		p-value
A-Ortho post	51.3	44.2	58.4	
B-VCU appropriate	60.6	54.4	66.5	0.0521
C-Private appropriate	86.2	80.5	90.4	<.0001
D-VCU interesting	52.2	46.0	58.4	0.8542
E-Private interesting	80.3	74.0	85.4	<.0001

Involvement in charitable programs such as operation smile, smiles change lives, etc.

Group	Mean	95% CI		p-value
A-Ortho post	47.1	40.1	54.2	
B-VCU appropriate	39.4	33.5	45.6	0.1062
C-Private appropriate	73.4	66.6	79.2	<.0001
D-VCU interesting	37.8	31.9	43.9	0.0507
E-Private interesting	64.9	57.8	71.4	0.0005

Involvement in community service events

Group	Mean	95% CI		p-value
A-Ortho post	48.2	41.1	55.3	
B-VCU appropriate	40.6	34.6	46.8	0.1140
C-Private appropriate	71.3	64.4	77.3	<.0001
D-VCU interesting	36.1	30.4	42.3	0.0120
E-Private interesting	62.8	55.6	69.4	0.0043

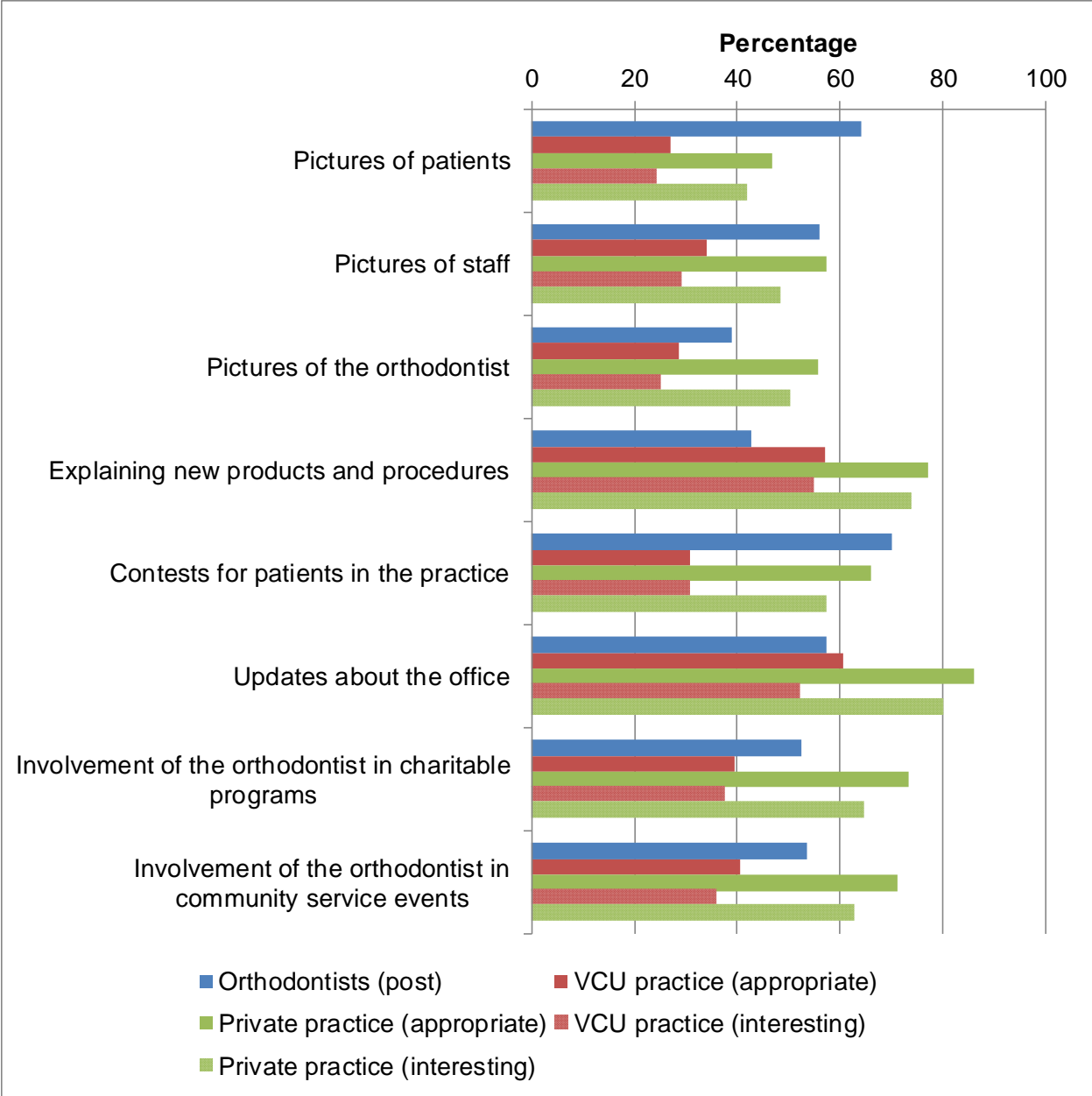


Figure 3. Content Posted on Social Media Websites

Reasons for non-use

The reasons why orthodontists did not use social media are summarized in Table 8. The most common reasons why Private Practice and VCU Practice participants did not use social media were due to privacy concerns, considering that it was a waste of time, and not having time to use the websites. When orthodontists were asked to list

their reasons for not using social media, their most common reason was for lack of time (63%), followed by privacy concerns (43%) and ethical issues (37%).

Table 8. Reasons for not using social media

Reasons for not using social media	Orthodontists (n=46)		VCU practice (n=73)		Private practice (n=21)	
	%	(n)	%	(n)	%	(n)
Waste of time	22	(10)	21	(15)	57	(12)
Concerns about privacy	43	(20)	29	(21)	52	(11)
No time	63	(29)	26	(19)	48	(10)
Didn't know they exist	0	(0)	0	(0)	0	(0)
Don't know how to use them	13	(6)	10	(7)	19	(4)
I would never use social media	13	(6)	11	(8)	10	(2)
Other	0	(0)	10	(7)	5	(1)
Concerned about ethical issues arising	37	(17)				
Not profitable	9	(4)				
Concerned about patients posting unfair remarks	30	(14)				

Marketing considerations

New cases per year

The orthodontist's average number of new cases per year ranged from 49 or less (2%) to 300 or more (26%). Using the midpoint of the range as a numerical value, the average orthodontist saw 226 new cases per year (SD = 83, 25th percentile=174, 75th percentile=324). A multiple regression analysis indicated that none of the demographic factors (age, gender, race, and ethnicity) were related to the number of new cases per year (P > 0.12).

Forms of marketing

Practitioners were also asked about the forms of marketing used in their practice. The results were summarized in Table 9. The majority used social-media sites (76%), a

practice website (59%), and business cards or brochures (52%). A multiple regression tested for the association of each marketing practice type (phone book advertisements, TV advertisements, newspaper advertisements, email marketing, business cards, or practice website, and social media) and the number of new patient starts per year. There was a significant relationship overall ($R^2 = 22\%$, $P < .0001$) and the following practices were found to have a significant correlation with new patient counts: newspaper advertisements, practice websites, and social media. Newspaper ads were negatively related with new patient starts ($P = 0.0003$). Orthodontist's not using newspaper ads had an average of 188 new patient starts and orthodontists using newspaper ads had an average of 129 new patient starts. Having a practice website was positively related to new patient starts ($P = 0.0035$). Orthodontists who had a practice website had more new patients per year (186 with a practice website versus 131 without a practice website). Orthodontists using social media also reported higher new patient starts ($P = 0.0376$) with new patient starts differing by 181 with using social media versus 134 without using social media. The following were not found to be associated with new patient counts: phone book advertisements, TV advertisements, email marketing, business cards, or other forms of marketing.

Table 9. Marketing Practices Used and the Relationship with the Number of New Cases per Year

Marketing practice	%	(n)	P-value ³	Std. Beta ⁴
Which forms of marketing do you use in your practice?				
Phone book ads	29	(54)	0.7740	0.02
TV ads	5	(9)	0.8019	0.02
Newspaper ads	16	(30)	0.0003*	-0.27
Email marketing	12	(22)	0.9040	0.01
Utilization of business cards or brochures	52	(99)	0.6576	0.05
Practice website ¹	59	(112)	0.0035*	0.23
Social media ²	76	(143)	0.0376*	0.25
I do not use any other forms of marketing in my office	14	(26)	0.4955	0.07

¹ “Do you have a practice website for your orthodontic practice?”

² “Do you use social media in your practice?”

³ Multiple regression on the log-count. $R^2 = 22\%$, $P < .0001$.

⁴ The standardized beta coefficient can be interpreted like a correlation.

Different media platforms

There are a variety of social media platforms available. Table 10 shows that Facebook was used by 75% of orthodontists. In order to test for the effect of each social media platform, they were all entered into a multiple regression model that also included the significant marketing factors (newspaper ads and practice website). The multiple regression increased in predictive ability of new patient starts to 28% and orthodontists who used Facebook reported a positive association with new patient counts ($P = 0.0004$). The difference was between an average count of 179 and 124 new patients. These two predicted patient counts describe the mean number of patients in practices who do (179) and do not (124) use Facebook, after covarying out all of the other factors. Table 10 also shows that Twitter use was also positively related ($P = 0.0128$) and that this difference was between 171 and 130 new patients for practices that use Twitter and practices that do not, respectively. YouTube use was negatively related to new patient starts ($P=0.0046$) and the difference was between 128 new patient starts with YouTube

use and 173 new patient starts without YouTube use. None of the other social media platforms were associated with new patient counts.

Table 10. Social Media Platforms

Media	%	(n)	P-value ¹	Std. Beta ²
Facebook	74.6	141	0.0004 *	0.31
Twitter	24.9	47	0.0128 *	0.23
Google+	23.3	44	0.4288	-0.06
YouTube	29.1	55	0.0046 *	-0.27
Linkedin	18.0	34	0.9376	-0.01
Pinterest	6.9	13	0.2331	0.09
Instagram	17.5	33	0.4738	0.06
Blogger	4.2	8	0.4020	0.06
Wikia	0.0	0		
Other	1.1	2	0.4193	-0.05

¹ Multiple regression on the log-count, and also included the following predictors: newspaper ads and practice website. $R^2 = 28\%$, $P < .0001$.

² The standardized beta coefficient can be interpreted like a correlation.

How often posted

Practitioners were also asked how often they post on their social media website(s). Their most common response was 2-4 times per week, followed by 1 time per day. Using the per-week counts as a continuous predictor, and including all of the significant factors so far, there was no relationship to new patient counts ($P > 0.4$).

Summary

Orthodontist's that engaged in negative practices—using newspaper ads, not having a practice website, not using Facebook, not using Twitter, and using YouTube were predicted to have a count of 65 new patients per year (95% CI = 47-90).

Orthodontist's that engaged in all the positive practices, were predicted to have 335 new patients per year (95% CI = 276-405). These combined effects were shown in Figure 4.

There were 9 orthodontists in the survey that engaged in all the positive practices and

their average count was 269 (4 of 9 were in the “300+” category and only 2 were in the “150 to 199” category). There were no orthodontists that engaged in all the negative practices. However, there were 18 orthodontists that did not use newspaper ads, did not have a practice website, and did not use Facebook, Twitter, or YouTube. Their average patient count was 138 (8 of 18 – 44% were in the “100 to 199” category and 5 were below that. Only 2 of 18 were in the “300+” category).

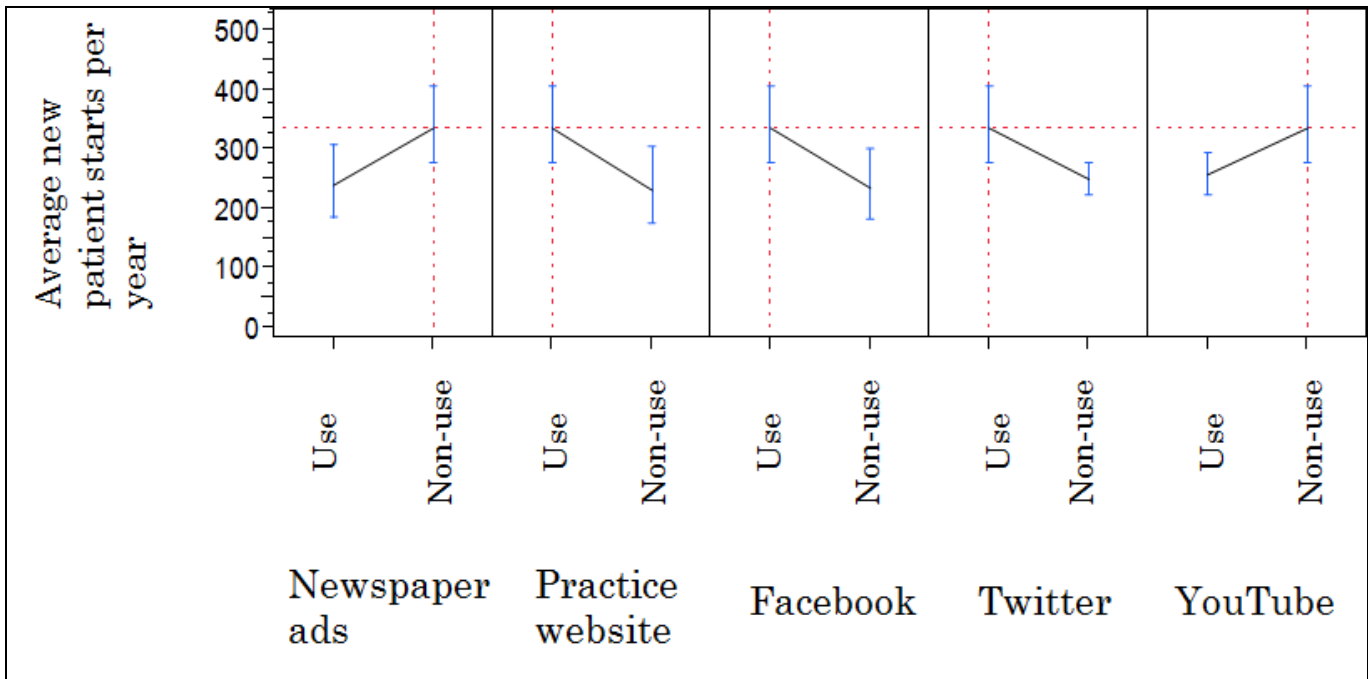


Figure 4. Relationships between Marketing Practices and New Patient Counts

DISCUSSION

The introduction of social media has revolutionized the way people interact with each other via the Internet. Social media websites allow individuals to have a dialogue with their friends, family, and other individuals from anywhere in the world. Recently, social media has taken a surprisingly significant role in healthcare as reported in numerous studies. To our knowledge, this is the first study in the orthodontic literature to report on social media usage and the perception of social media use in the orthodontic practice among patients and orthodontists. Our study provides relevant information for orthodontists who want to integrate social media into their practices.

Demographics

The results of our study showed that orthodontists are more often male (71%) than female (29%), which is consistent with previous reports from the AAO.³⁰ The increased age of the patient/parent groups is explained by the fact that most of our participants were parents of patients (70.9%). The VCU Practice participants had a significantly lower family income mean than the Private Practice participants. Patients or parents seeking treatment at the VCU Orthodontic Clinic may be searching for the lower treatment fee that is associated with being treated in an educational facility. They may be doing so due to the fact that they have a lower income. Currently, the VCU Orthodontic Clinic accepts approximately 26% Medicaid patients which may, in part, explain the lower income associated with this group.

Social media use

Our study showed that 89% of Private Practice participants, 71% of VCU Practice participants, and 76% of orthodontists used social media. Social media use

was more common in females and younger participants. A recent report found that 73% of online adults use social networking sites and that 79% of female adults use social media compared to 69% of males. They also found that 89% of adults that are between 18-29 years old use social media and that usage decreases steadily with age.³¹ This is consistent with the findings in our study. Private Practice participants used social media more than VCU Practice participants. This may be due to the fact that families with a lower income may have limited access to technologies. The percentage of orthodontists using social media in our study is inconsistent with a previous study investigating usage among general dental practices. Henry et al found that 52% of general dentists use social media in their practice which is lower than the percentage usage among the orthodontists in our study.¹¹

Social media platforms

When comparing the different media platforms, Facebook was the most commonly used social media platform among all of the groups. Marketing research has revealed that Facebook is the most common site as two-thirds of online adults say that they are Facebook users.³² This is consistent with the findings in our study.

The results of our study showed that Private Practice participants used YouTube more than both VCU Practice and orthodontists. The decreased usage among VCU Practice participants may be due to an overall lower percentage usage of social media in this group. Orthodontists may not use YouTube as much because it is not as interactive as other social media sites such as Facebook and Twitter.

Why/how often/when

Most of the patient/parent participants in our study used social media to communicate with friends and family. The Pew Research Foundation found that roughly two-thirds of social media users said that staying in touch with current friends and family members was a major reason they use these sites.³³ This is consistent with the findings in our study.

The second most common reason why the participants in our study used social media was to search for products. A recent report found that 60% of people use social media to learn more about consumer products and over 60% read consumer feedback.³⁴ The results of our study showed that Private Practice participants used social media to search for products more than participants in VCU Practice. In addition, when the Private Practice participants were asked if a good reputation on a social media website would influence their decision to go to or bring their child to that orthodontist, 63% of Private Practice participants said that a good reputation would influence their decision. Additionally, 27% of Private Practice participants said that they use social media sites to find out more about a healthcare provider.

Consumers go online more to search for general healthcare information and for information about a healthcare provider. Stambor reported that 62% of online shoppers read product related comments from Facebook friends and 75% of those who read the comments on Facebook have then clicked through to the retailers website.³⁵ Also, consumer research has shown that 89% of all U.S. internet users do an online search before making a purchase, even when the purchase is made at a local business.³⁶

Our results also showed that VCU Practice participants used social media more during the day than did Private Practice participants. This is consistent with a report where they found that social media users with a lower household income spend more time on the networks than social networkers with a higher household income. In addition, this report also found that unemployed social networkers spend more hours per day on social media than networkers who are employed.³⁷ Our study found that the average amount of time patients and parents spend on social media sites daily was 45 minutes. Other authors have reported a much higher daily usage, with the average American spending 3.2 hours per day on social media website(s).³⁷

The most common reason why orthodontists used social media in their practice was because most of their patients used social media websites. The next most common reason was because social media sites were useful in communicating with their patients. Shuman et al asked dental professionals why they chose to use social media and the majority of practices did so because they found that social media offered an effective and efficient way to communicate with their patients.³⁸ This is consistent with the findings in our study.

According to our results, orthodontists most commonly post information or pictures on social media websites 2-3 times per week, followed by one time per day. A Pew Research Foundation study showed that you should not flood consumers news feed with too much information and suggests that you should post information no more than one time per day.³⁹ Therefore, most of the orthodontists in our study are adequately timing their posts.

Our study showed that most orthodontists are posting information on their social media sites in the morning or afternoon and most patients and parents are using social media in the evening. The best time for a business to post depends on your business and your audience. A recent report stated that a Facebook post receives half its reach within 30 minutes and therefore you should try to determine when your fans are on Facebook and aim to schedule your posts around that time.³⁹ According to this recent report, perhaps orthodontists should post information on their social media sites more often in the evening rather than during business hours.

Types of content

According to our results, Private Practice participants are less interested in viewing pictures of patients than they are about information regarding the practice and community. This may be due to their concerns about privacy and confidentiality. In general, VCU Practice participants were not as interested in viewing their orthodontist's information posted on social networks as Private Practice participants were. Although the VCU Orthodontic Clinic does have a Facebook website, they do not update their information (twice per month) as often as the average private practice orthodontist does (2-3 times per week). Some suggest that it is better to never create a Facebook website in your practice than to create one and not update it at least a few times a week. Also, Private Practice participants may be more interested in viewing posted information because they have higher expectations for an experience when they visit different orthodontic offices such as outstanding customer service, involvement in activities and contests and in the community.

Reasons for non-use

Patients and parents may not use social media for a variety of reasons. The results of our study showed that most parents and patients do not use social media because of privacy and time concerns. Orthodontists also do not use social media because they either do not have time or because they have concerns about privacy ethical issues. Dubose also found that the most prevalent barrier regarding the use of social media in health care among healthcare providers and patients is the concern about compromised privacy and confidentiality.²⁵ This is consistent with our results.

Marketing

Over the years, marketing has been practiced via traditional means of media such as television, billboards, pamphlets, radio, newspaper, and phone book ads. Social media marketing has allowed businesses to have a dialogue with their patients in an interactive way not possible with traditional advertising. Previous consumer research has found that only 14% of people trust advertising compared to 78% who trust recommendations and referrals.⁴⁰ Building relationships and engaging consumers on social media can build trust and give prospective patients an opportunity to read their friends, families, and the general public's reviews.

Researchers in the dental field suggest that dental practices will not survive without a strong online presence.¹⁹⁻²¹ The results of our study showed that the majority of orthodontist's use social media sites, a practice website, or business cards/brochures to market to their prospective patients. Orthodontists who had a practice website and used social media had more new patient starts per year than those who did not. Multiple reports have shown the importance of using a practice website in dental practices.

However, to our knowledge, our study is the first to report a correlation between social media usage and new patient starts in the orthodontic practice. A previous study did find a correlation between social media and new patient visits in hospitals. They found that the hospitals with the largest visitor base had more 'likes' and comments on their Facebook posts, and they were rewarded by having more people recommend their hospital than facilities with less visitors.⁴¹

Our study also found that orthodontists who use newspaper ads were found to have fewer new patient starts per year. This may be due to a number of factors. Orthodontists who have a fewer new patient count per year may be simply using newspaper ads in attempt to acquire more new patients. Another explanation may be that patients and parents view these practices with newspaper advertisements as not being as technologically advanced as other orthodontic offices. Finally, potential patients may not be viewing their advertisements due to the overwhelming information and news that can now be accessed on the Internet. The Pew Research Foundation showed that American newspapers lost \$10 of print advertising revenue for every \$1 they gained in online ad revenue. Another report found that since 2008, newspapers have been falling behind online marketing in general and they suggest that this reflects the rising power of internet sites that do a better job online of reaching the news media's audiences.⁴²

The results of our study showed that 74% orthodontists used social media in their practice, with the highest preference for Facebook. This is consistent with a report on dental practitioners usage of social media where they found that 75% of respondents used social media for their practices. They also found that Facebook was the most

common site among dental professionals.³⁸ Facebook and Twitter were positively related to new patient counts. According to a recent report, Facebook was the number one social marketing tool for companies with 100+ employees, followed by Twitter.¹⁷ This is also consistent with our findings.

YouTube use was negatively related to new patient starts. Johnson found that in order for social media in healthcare to be effective, it should be interactive.⁴¹ YouTube is much less interactive than both Facebook and Twitter and therefore may be a reason why there is a negative association between new patient counts and YouTube.

CONCLUSION

- Social media use was more common in females and younger adults.
- Facebook was the most commonly used social media site among all of the participants.
- Orthodontist's posted information more often in the morning and afternoon and patients used social media mainly in the evening
- In general, patients are more interested in viewing information regarding the practice and community as opposed to information regarding patients in the practice.
- The most commonly used marketing strategies in the orthodontic practice were social media and a practice website.
- Newspaper advertisements were negatively related to new patient starts.
- Social media and practice websites were positively related to new patient starts.
- Facebook and Twitter were negatively related to new patient starts.
- YouTube was negatively related to new patient starts.

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Vita

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