*Original Article*

# The nature and accuracy of Instagram posts concerning marketed orthodontic products: *A cross-sectional analysis*

**Aslam Alkadhimi[a]; Dalya Al-Moghrabi[b]; Padhraig S. Fleming[c]**

**ABSTRACT**

**Objectives:** To scrutinize claims contained within Instagram posts related to six popular marketed orthodontic products.

**Materials and Methods:** Three hundred publicly available Instagram posts were identified using the following Instagram hashtags: *#carrieremotion, #damonbraces, #invisalign, #acceledent, #propelorthodontics,* and *#myobrace*. Pilot coding was undertaken on a subset of claims (n = 50) and a coding guide was developed. The associated claims were categorized under 24 recognized themes and their accuracy assessed on a five-point scale.

**Results:** Of 1730 posts screened, 300 were included for analysis. The majority of posts were based on photographs (n = 244, 81.3%) with the remainder (n = 56, 18.7%) including videos. Half of the posts involved a picture of the product in isolation (n = 150, 50%), with clinical cases presented in a minority (n = 99, 33%). Overall, 472 claims were included with treatment duration being the most frequent theme (n = 125, 26.5%). In terms of accuracy, most of the claims were judged to be "false" (n = 283, 60%) with less than 2% considered "objectively true."

**Conclusions:** Most of the claims relating to six popular marketed orthodontic products concerned treatment duration. The vast majority of these claims were not supported by evidence and were judged to be false. Efforts should be made to promote the provision of accurate orthodontic information and to verify marketing claims on social media platforms. (*Angle Orthod.* 2022;92:247–254.)

**KEY WORDS:** Social media; Marketing; Advertisement; Products

## INTRODUCTION

Social media marketing offers a targeted, powerful, and cost-effective means of promoting services and products with national and international reach.[1,2] These platforms have become very popular among healthcare providers for information sharing with colleagues and the general public.[3] Instagram use among orthodontists and related companies has become increasingly ingrained in recent years.[4]

The majority of orthodontists and patients now use social media[1] with more than one-third of patients reporting searching their dentists on social media.[5] Social media is also the most popular marketing strategy in orthodontics (76%), recently overtaking the use of practice websites.[1] Advertisements are common on Instagram and may be used to influence "followers" with clinical and scientific claims. Clinical content is, however, not universally present with some advertisements focusing on a product in isolation, and lacking either intraoral images or longitudinal records. The pervasion of new technologies in orthodontics including aligner therapy, fixed sagittal correctors, self-ligating brackets, and proprietary means of accelerating tooth movement has heralded a parallel increase in marketing among treatment providers and marketing companies.[6] These advertisements have penetrated social media, scientific journals,[6,7] and professional conferences.

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**Table 1.** Definition of the Different Accuracy Categories of Claims[13]

| Accuracy of Claim | Definition | Representative Claim[a] |
|---|---|---|
| A: Objectively True | A claim that is based on scientific evidence and presented all relevant information whether positive or negative | *"In my opinion, based on evidence, aligners do not solve all cases. But they can be a good tool in orthodontic treatment..."* |
| B: Selected Facts | A claim that presented some true selected facts based on scientific evidence but omitted important information related to a product | *"What are the main benefits of Invisalign treatment? Transparent Invisalign aligners are practically invisible ... you can remove them to eat and drink..."* |
| C: Minimal Facts | A claim that exaggerated the benefit of the product, with an overemphasis on the benefit supported by poor-quality scientific evidence | *"She opted for the most comfortable and aesthetic treatment that exists!"* |
| D: Nonfacts | A claim that presented an intangible characteristic. Often these claims were in the form of product opinions or lifestyle claims. Opinions say nothing about the product, but clinicians/patients are left to misinterpret the opinion as an objective product evaluation. | *"Do you also believe you deserve the best??! I always try to offer the best for my patients because anything less than that will not be enough !!!..."* |
| E: False | A claim that was objectively false either due to lack of evidence to support it or contradicting available evidence | *"...As we know, the Myobrace system stimulates nasal breathing, which raises the level of nitric oxide, a bronchodilator that helps fight viruses and their infections..."* |

[a] Paraphrased claims.

Orthodontic advertisements are acknowledged to be lacking in a robust evidence base.[5–7] Marketing claims relating to orthodontic products disseminated within scientific journals were, for example, founded on high-level evidence in less than 2% of these.[8] However, the nature and accuracy of claims related to orthodontic products disseminated on social media has not been formally evaluated.

Therefore, the aim of the current study was to scrutinize the content of professional Instagram posts (made by clinicians, practices, laboratories, and/or companies) and to evaluate the accuracy of any marketing claims concerning a predefined subset of popular marketed orthodontic appliances and adjuncts.

## MATERIALS AND METHODS

A cross-sectional content analysis of publicly available advertisement posts on Instagram was undertaken with screening performed from January to March 2021. Heavily marketed orthodontic products associated with various common treatment modalities (Class II correction, self-ligating brackets, clear aligner therapy, non-surgical acceleratory tooth movement, surgical acceleratory tooth movement, and myofunctional orthodontics) were identified by searching multiple word combinations in the form of hashtags on Instagram (Appendix). Each term was entered into the search facility selecting the "Tags" tab. The hashtag with the highest number of posts for each treatment modality was identified.

The following inclusion criteria were applied: posts from orthodontic or marketing accounts (clinicians, laboratories, companies, or practices) with no language restriction. Exclusion criteria consisted of posts from patients, non-orthodontic related posts, posts with no claims in the subtext, and duplicates. All non-English subtext was translated into English using Google Translate (https://translate.google.com).

The six hashtags used were: #carrieremotion, #damonbraces, #invisalign, #acceledent, #propelorthodontics, and #myobrace (Appendix). The top 50 posts per hashtag (n = 300) were identified and the associated claims subjected to further analysis. This number was considered sufficient to obtain thematic saturation of the claims based on previous research.[4,9,10]

The nature of the included posts were analyzed qualitatively and quantitatively in relation to type (photo vs video), number of likes, content (clinical case, picture of product, or text-based) and account type (clinician, company, lab, or practice). Claims were defined as any statement concerning the safety, efficacy, and/or efficiency of a product/appliance and were coded deductively based on their content under initial themes. The themes used were predefined and based on 14 key outcome domains and the associated 54 outcomes considered relevant to patients and clinicians.[11,12] Pilot coding of the themes and evaluation of the accuracy of any claims made was undertaken by two authors (AA and DA) on a subset of claims (n = 50), with conflicts resolved by discussion. The accuracy of the information (claims) within each post was rated by one author (AA) against best available evidence using a modified five-point scale (Table 1) as follows:[13] A: Objectively true, B: Selected facts, C: Minimal Facts; D: Nonfacts, and E: False.

Extracted data were entered into Microsoft Excel (version 16.0, Microsoft, Redmond, WA, USA) and descriptive statistics including frequencies and percentages were performed. Intrarater reliability of accuracy of claims assessment 4 weeks after initial data collection was tested using a weighted Cohen's

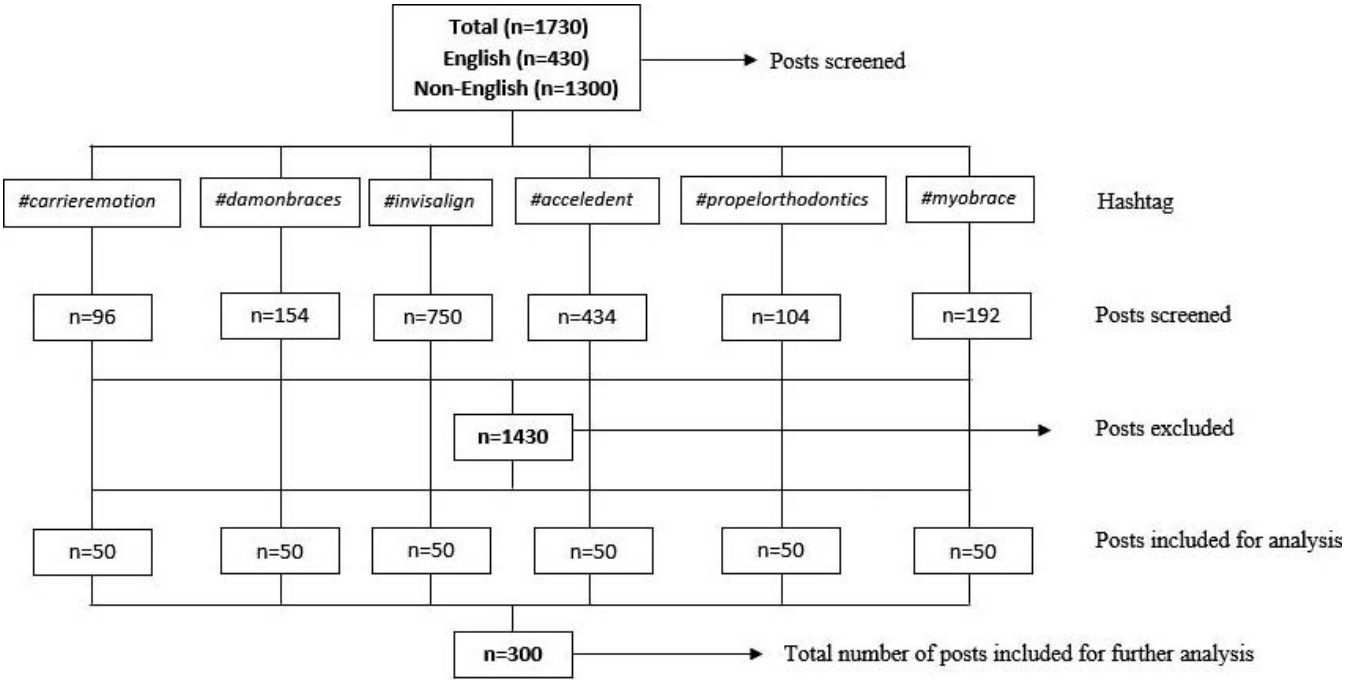



**Figure 1.** Flowchart of screened and included Instagram posts.

kappa with excellent levels of agreement observed (k = 0.89). Similarly, the interrater reliability showed substantial agreement (k = 0.79).

## RESULTS

A total of 1730 posts were screened using the six hashtags to reach a sample of 300 included Instagram posts (Figure 1). Three-quarters of the screened posts were non-English language (75.1%, n = 1300). Of the total posts screened, *#invisalign* yielded the highest number of posts (n = 750) and *#carrieremotion* the lowest (n = 96).

*#carrieremotion* yielded the highest average number of likes per post (n = 116; Table 2), followed by *#damonbraces* (n = 90), with *#invisalign* having the lowest (n = 23). The majority of the identified posts were photographs (81.3%, n = 244). Half of these displayed a picture of the product (50%, n =150), with a smaller proportion involving clinical cases (33%, n = 99), and with text-based posts being the least prevalent (4.3%, n = 13). *#carrieremotion* and *#damonbraces* used clinical cases primarily while the other four hashtags primarily involved pictures of the product.

From the 300 Instagram posts selected, 472 claims were identified (Figure 2). The *#myobrace* was associated with the highest number of claims (22%, n = 104) while the fewest were linked to *#carrieremotion* (12.3%, n = 58). Claims related to shorter treatment duration was the most frequently coded theme (26.5%, n = 125; Figure 3). Improved occlusal outcomes, less associated pain, and higher treatment success were reported 66 times (14%), 56 times (11.9%), and 46 times (9.7%), respectively. The following themes were only reported once: cost, condylar changes, microbial composition, and patient satisfaction.

Almost two-thirds of the identified claims were judged to be false (60%, n = 283; Table 3; Figure 4). Overall, of the 472 claims, only 1.7% were objectively true (n = 8). The most prevalent accuracy level for *#carrieremotion* and *#invisalign* was "selected facts," 41.4% and 65%, respectively (Figure 4). For *#damonbraces, #acceledent, #propelorthodontics,* and *#myobrace,* the most frequently coded accuracy level was deemed to be "False" at 48.6%, 87.9%, 97.6%, and 77%, respectively.

## DISCUSSION

Based on this cross-sectional analysis, the information contained in Instagram posts concerning orthodontic products mirrored those observed in journal advertisements and websites with little factual basis and many being misleading.[7,8,14,15] In terms of content, use of isolated images of products predominated with comprehensive documentation of clinical use being the exception. Regarding marketing claims, suggestions of enhanced treatment efficiency were the most pervasive. This may reflect the intended remit of two of the analyzed devices (Propel [Propel Orthodontics, Ossining, NY] and AcceleDent [OrthoAccel Technologies Inc., Houston, TX]) but also mirrored the contemporary focus on accelerated orthodontics.[16,17] A purported improved technical outcome was the second most

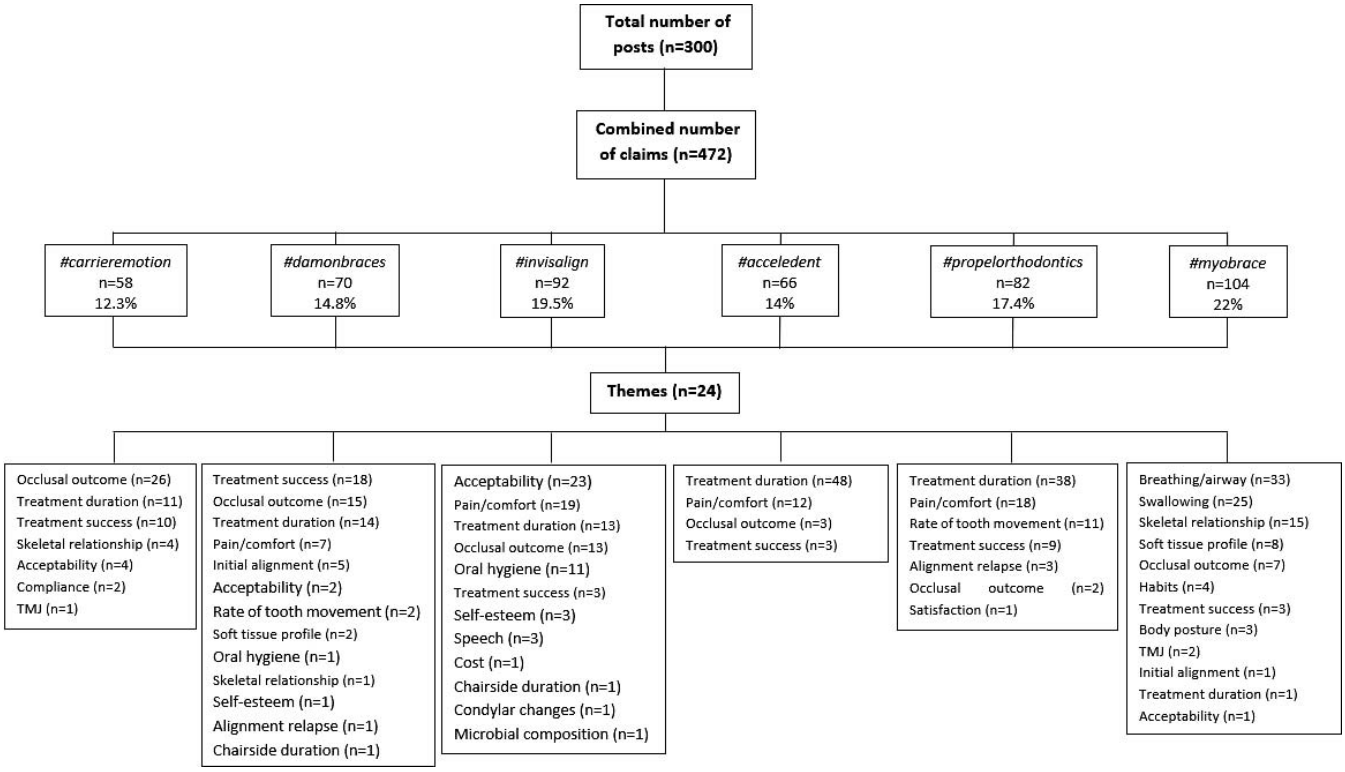



**Figure 2.** Distribution of claims according to themes.

commonly coded theme; there was, however, no evidence in the literature to support this assertion of superiority.[18–20]

The Instagram posts included in this study relied more heavily on still pictures, mainly of the product in question, as opposed to videos, in conveying associated claims. This may reflect the fact that the average user engagement on Instagram with photos has consistently been higher than for videos.[21] However, this disparity may also relate to the relative ease of generating photographs to convey a message rather than to creating videos. Instagram also offers further means for sharing content: stories. It may be valuable to consider this channel of marketing in future research, particularly as users are known to become more interested in a product after viewing a related "story."[22]

The observations concerning the veracity of claims associated with each appliance or adjunct were broadly similar. The finding that less than 2% of observed claims were true was disappointing but very much in keeping with findings pertaining to advertise-

**Table 2.** Nature of Included Posts (Content, Number of Likes, Post Type, and Account Type)

| | Post Type | | | | Post Content | | | |
|---|---|---|---|---|---|---|---|---|
| | No. (%) | | | | No. (%) | | | |
| Product/Device | Photo | Video | Total No. of "Likes" | Average No. Of "Likes" Per Post | Clinical Case | Picture of Product | Text-Based | Other |
| Carriere Motion (n = 50) | 45 (15%) | 5 (1.7%) | 5790 | 116 | 45 (15%) | 2 (0.7%) | 1 (0.3%) | 2 (0.7%) |
| Damon (n = 50) | 40 (13%) | 10 (3.3%) | 4482 | 90 | 34 (11.3%) | 10 (3.3%) | 2 (0.7%) | 4 (1.3%) |
| Invisalign (n = 50) | 40 (13%) | 10 (3.3%) | 1145 | 23 | 3 (1%) | 38 (12.7%) | 1 (0.1%) | 8 (1.7%) |
| Acceledent (n = 50) | 42 (14%) | 8 (2.7%) | 3575 | 72 | 2 (0.7%) | 35 (11.7%) | 4 (1.3%) | 9 (3%) |
| Propel (n = 50) | 35 (11.7%) | 15 (5%) | 1837 | 37 | 1 (0.3%) | 42 (14%) | 2 (0.7%) | 5 (1.7%) |
| Myobrace (n = 50) | 42 (14%) | 8 (2.7%) | 2670 | 53 | 14 (4.7%) | 23 (7.7%) | 3 (1%) | 10 (3.3%) |
| **Total (n = 300):** | 244 (81.3%) | 56 (18.7%) | | | 99 (33%) | 150 (50%) | 13 (4.3%) | 38 (11.7%) |

-Carrire Motion (CMA; Henry Schein Orthodontics, Carlsbad, CA)
-Damon (Ormco, Glendora, CA)
-Invisalign (Align Technology, Tempe, AZ)
-Acceledent (OrthoAccel Technologies Inc, Houston, TX)
-Propel (Propel Orthodontics, Ossining, NY)
-Myobrace (Myofunctional Research Co., Rancho Cucamonga, CA)

**Table 3.** Representative Examples of "False" Claims for Each of the Six Hashtags

| Hashtag | Representative Examples of False Claims |
|---|---|
| *#carrieremotion* | *"Main advantages of Carriere Motion 3D. . .Significantly shorter treatment time. . ."*<br>*". . .obtaining greater cooperation from the patient and consequently a faster and more stable result. . ."* |
| *#damonbraces* | *"The Damon System has been proven to treat faster and require fewer appointments than traditional braces. . . ."*<br>*"why Dr X uses Damon braces. . .it doesn't cause as much tenderness compared to traditional brackets"* |
| *#invisalign* | *"some of the health benefits of Invisalign. . .Reduced pain from TMJ disorder symptoms caused by misalignment. . ."*<br>*"#invisalign is a lot faster! On average about 6 months of treatment the cases are already solved !!!"* |
| *#acceledent* | *"#acceledent moves teeth 50% faster, clinically proven! So what are you waiting for to try accelerated orthodontics?. . ."*<br>*"The appliance, used daily for 20 minutes, gently vibrates the teeth and surrounding bone to accelerate tooth movement by 38%-50%..."* |
| *#propelorthodontics* | *"Our awesome patient, xx, is beginning the weekend with a Propel treatment which will accelerate his orthodontic journey by 50%! Dr. xx carefully creates painless dental dimples to allow the teeth to move at a faster rate. . ."*<br>*"Do we accelerate? Up to 70% faster treatment with Propel. . ."* |
| *#myobrace* | *"how to provide your child with optimal development?...Myobrace. . .proper functioning of the perioral muscles and face. . ."*<br>*"We guarantee our treatment will help your child breathe through the nose, correct resting position of the tongue, swallow correctly, keep lips together. . ."* |

ments in orthodontic journals.[8] Specifically, in an analysis of 124 advertisements, just one-third incorporated a scientific reference.[8] Most of these were non-clinical and less than 2% were deemed to represent high-quality evidence. It is unsurprising that social media content involved less scientific content than advertisements in journals; nevertheless, given their reach and targeted nature it is essential that any claims are derived from well-founded data.

The potency of social media-based advertising dictates that this medium offers significant potential for improved awareness and education among both orthodontic providers and patients. Additionally, social media, apps, and websites have been harnessed to positively influence patient behaviors and knowledge.[23,24] Clinicians are legally and ethically obliged to present information without overemphasis on the benefits or exclusion of harms, and should not rely on unsupported claims or poor evidence.[25–27]

**Table 2.** Extended

| Account Type | | | | |
|---|---|---|---|---|
| No. (%) | | | | |
| Clinician | Company | Lab | Practice | Other |
| 27 (9%) | 1 (0.3%) | 0 (0.0%) | 14 (4.7%) | 8 (2.7%) |
| 28 (9.3%) | 8 (2.7%) | 1 (0.3%) | 13 (4.3%) | 0 (0.0%) |
| 26 (8.7%) | 7 (2.3%) | 0 (0.0%) | 16 (5.3%) | 1 (0.3%) |
| 15 (5%) | 14 (4.7%) | 1 (0.3%) | 20 (6.7%) | 0 (0.0%) |
| 32 (10.7%) | 9 (3%) | 0 (0.0%) | 9 (3%) | 0 (0.0%) |
| 19 (6.3%) | 18 (6%) | 0 (0.0%) | 13 (4.3%) | 0 (0.0%) |
| 147 (49%) | 57 (19%) | 2 (0.7%) | 85 (28.3%) | 9 (3%) |

Notwithstanding this, social media platforms may be used to propagate misleading information as evidenced by the overwhelming majority of posts in the present cross-sectional analysis. Specifically, almost two-thirds of the claims relating to the six products were "false" (60%, n = 283) and only 1.7% (n = 8) were "objectively true." These findings mirror previous research in which 82.3% of Facebook pages of orthodontic specialist practices in Australia did not comply with accepted guidance on the advertising of healthcare.[28] The key violation was the provision of

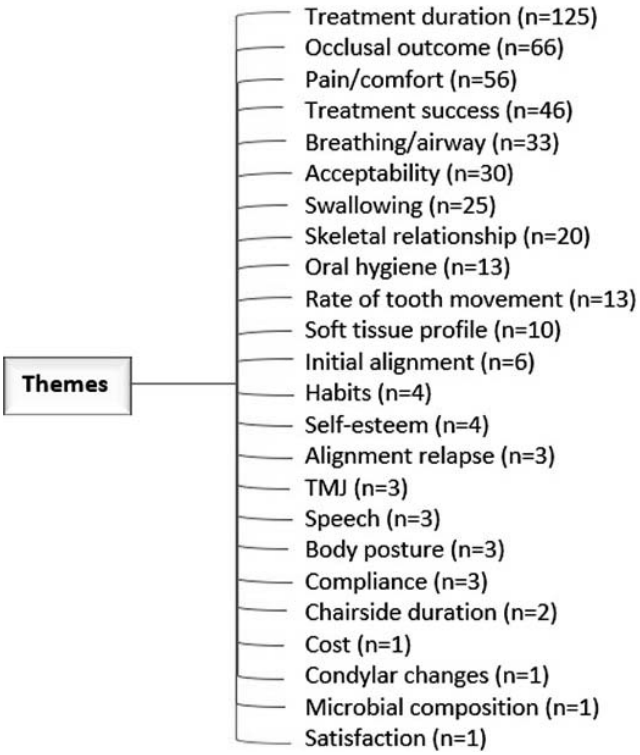
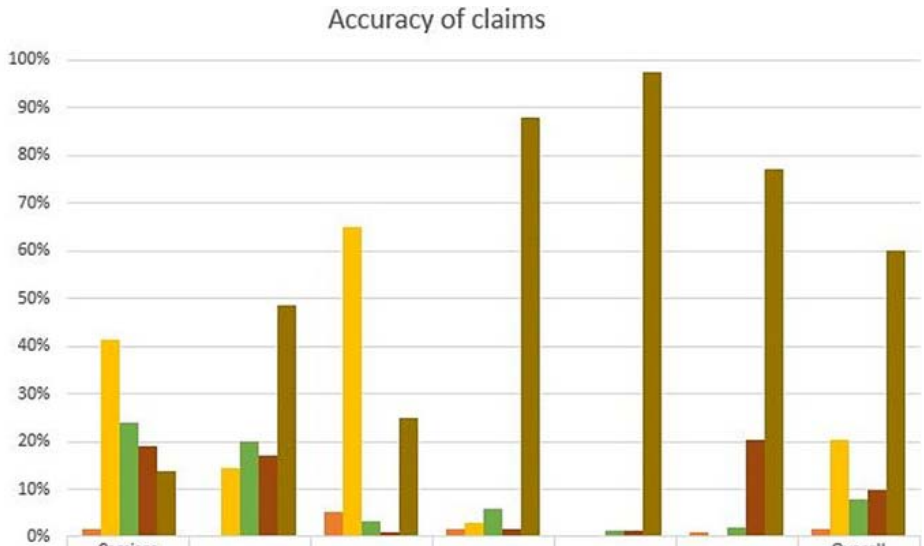



**Figure 3.** Frequency of claims in each of the themes identified.




| | Carriere Motion | Damon | Invisalign | Acceledent | Propel | Myobrace | Overall accuracy |
|---|---|---|---|---|---|---|---|
| Objectively true | 1.70% | 0% | 5.40% | 1.50% | 0% | 0.90% | 1.70% |
| Selected facts | 41.40% | 14.30% | 65% | 3% | 0% | 0% | 20.30% |
| Minimal facts | 24.10% | 20% | 3.20% | 6% | 1.20% | 1.90% | 8% |
| Nonfacts | 19% | 17.10% | 1.10% | 1.50% | 1.20% | 20.20% | 10% |
| Flase | 13.80% | 48.60% | 25% | 87.90% | 97.60% | 77% | 60% |

**Figure 4.** Distribution of claims according to accuracy (n = 472).

information that potentially risks creation of unreasonable expectations.[28] Clearly, it is important that patients access reliable information online. A downstream effect of unreliable information may also be felt among residents and other students given the limited perusal and appreciation of evidence-based approaches among seasoned practitioners and more recent graduates.[29] As such, the impact of unreliable information may be multilayered. Following a simple model can be a useful guide for advertisers and help prevent making misleading/false claims on social media (Figure 5).

The present study was confined to six marketed products. These were selected on the basis of their recent prominence and promotion. There is therefore a risk of selection bias and the possibility that these findings may not reflect general trends. Nevertheless, given the breadth of data obtained, as well as the consistent findings, the veracity of information concerning orthodontic marketed products on Instagram is certainly questionable. As a bespoke tool to assess dental claims does not exist, a pre-existing tool was adapted from one used in research related to drug advertisements.[13] This involved a coded rubric based on a five-point scale to improve the degree of precision with high levels of intra- and interrater reliability being observed. The content analysis involved an exploration of the underlying meaning of included Instagram posts to allow detection of direct and implied claims offering a more holistic evaluation. Manipulation of photographs, eg, postured jaw positions to simulate mandibular growth or edited photos to brighten tooth color, as well as selective sharing of best treated cases may represent further forms of misleading Instagram posting.[30] However, these were not assessed in the current study due to difficulty in detecting photo editing or manipulation.

## Implications and Recommendations

- There is little or no quality control of clinical content posted on social media. Therefore, there is an ethical obligation to raise awareness of the risk of accessing misleading claims on a permissive medium such as Instagram.
- ”Patient-centered” advertising and marketing on social media is of paramount importance. Unsubstantiated claims that are not supported by a sound evidence base should be avoided and the personal nature of any claims should be admitted.
- The advent of “trusted” sites, for example, social media accounts linked to or endorsed by regulatory bodies and associations, may assist with the dissemination and promotion of reliable and accurate information.
- Professional regulatory bodies and societies are encouraged to develop specific guidelines on social media advertising, similar to those targeting advertisement in general.[25–27]

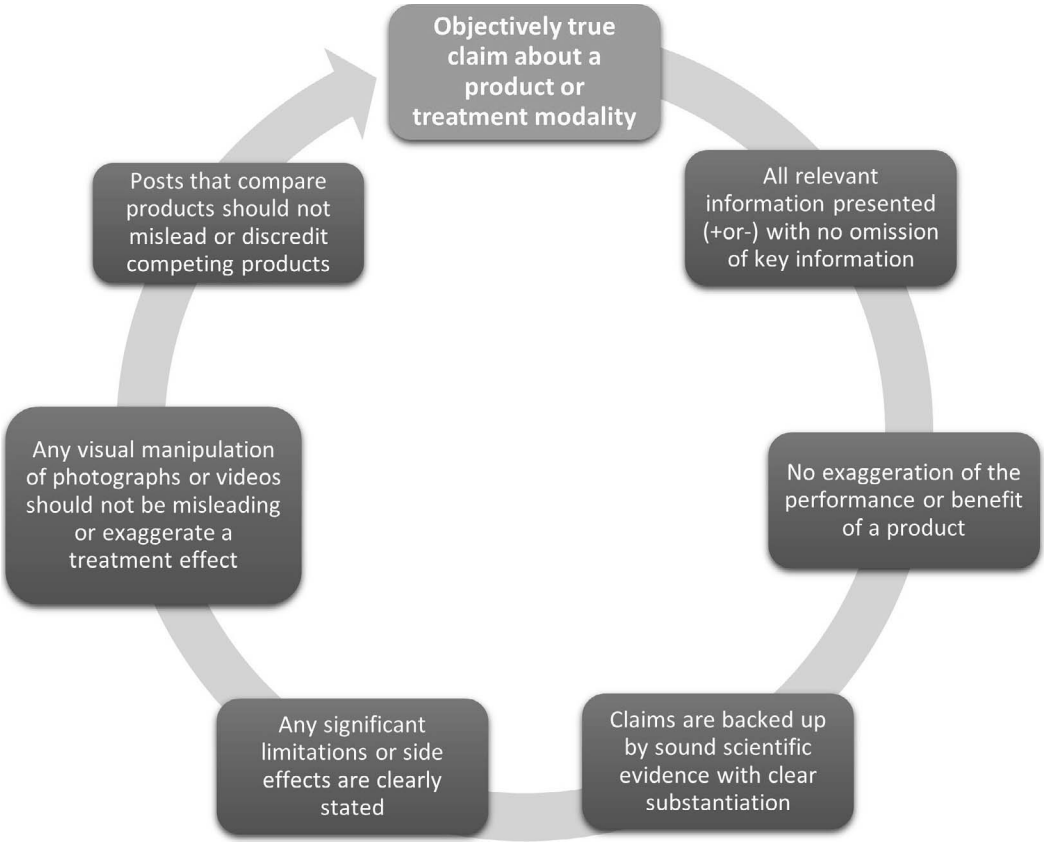



**Figure 5.** A proposed model for avoiding misleading and false claims on social media.

## CONCLUSIONS

- Based on cross-sectional evaluation of a subset of marketed products, the use of isolated photographs of marketed orthodontic products without complementary clinical images appears to predominate.
- The majority of the claims relating to six popular marketed orthodontic products concerned treatment duration with less than 2% of these deemed to be objectively true.
- Concerted attempts should be made to encourage the provision of accurate orthodontic information and marketing on social media sites.

## ACKNOWLEDGMENTS

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The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## SUPPLEMENTAL DATA

Supplemental data is available in the Appendix online.

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