

Cellular therapy injections in today's orthopedic market: A social media analysis

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Abstract

Background. The current state of cellular therapy for musculoskeletal conditions is at a crossroads. Marketing efforts are often outpacing clinical evidence and regulatory control. **Questions/purposes.** This study was an effort to describe the marketing of cellular therapy in musculoskeletal medicine by evaluating the content in popular social media channels. Specifically, media posts were evaluated for the following: (1) perspective, (2) tone, (3) content and (4) visibility. **Patient and methods.** Social media content related to cell therapy for musculoskeletal conditions was assessed in a search using 28 hashtags on the public domains of Instagram and Twitter over a 2-year period (2014–2016) that resulted in analysis of 698 posts. Supplemental analyses of LinkedIn and Facebook domains were also conducted. A categorical scoring system was used to analyze perspective (patient, family or friend, business or organization), tone (positive, negative), content (education, advertisement, research, media coverage or patient experience) and visibility (number of hashtags per post). Sub-analyses of the advertisement content from various perspectives (patients, physicians and businesses) were performed. **Results.** The media perspective was most frequently from a business or organization (83%; n = 575). A total of 94% of the posts had a positive tone and only 6% had a negative tone, and the only negative posts came from patients (60% positive and 40% negative). The most common content of social media posts were advertisements, representing 68% (n = 477) of all posts; this was confirmed in the Facebook analysis. The mean number of hashtags was five per post. Sub-analyses revealed approximately half of the advertising posts originated from a single business that recruited physicians to market their cell-based therapies on social media, which was confirmed in the LinkedIn analysis. **Conclusion.** The market messages related to cell-based therapies for musculoskeletal conditions available on social media are dominated by businesses that seem to use a network of physicians, apply several hashtags to enhance visibility and advertise these largely unproven modalities. The posts portray an almost exclusively positive tone, without providing a “fair balance” on the risks, benefits and limitations.

Key Words: marketing, musculoskeletal, orthopedic surgery, social media

Introduction

Cellular therapies represent a promising approach to nonsurgical restoration of function, with the potential to improve structure, function and symptoms. However, if these therapies are to replace surgery, they must be proven to be safe and effective in clinical trials [1]. Several injection therapies are clinically available or are under investigation for various musculoskeletal conditions (e.g., osteoarthritis [OA]), focal chondral defects [FCDs] and osteonecrosis). Some injection-based cell therapies contain native au-

togenous cells (e.g., bone marrow aspirate concentrates [BMACs] contain native connective tissue progenitors [CTPs]). Other therapies use culture-expanded cells (e.g., mesenchymal stromal cells [MSCs]), which may be autogenous or allograft transplants. Other injection therapies do not contain cells (e.g., hyaluronic acid [HA], platelet-rich plasma [PRP], platelet poor plasma [PPP], platelet lysate [PL], or interleukin 1 receptor antagonist [IL1RA]) [1–17]. To date, none of these injection therapies have been widely adopted, and none have been proven superior to conventional therapies in well-designed clinical trials.

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A preferred therapy would not only modify symptoms in the short term, but also could change the course of disease progression or even restore normal tissue structure over time. In theory, therapies that transplant cells that have the capacity to proliferate and differentiate to restore new tissues would be the most likely to result in structural restoration. However, the efficacy and safety of cellular therapy in musculoskeletal medicine remains to be determined. A recent systematic review assessing the efficacy and evidence quality for intra-articular cellular therapy injections for OA and FCDs of the knee demonstrated that the methodological quality of the existing literature is poor [1]. Although these studies report no major adverse events, they also fail to prove generalizable benefit to patients [1]. Such high level studies are limited in this field, because of their failure to: (1) apply standardized nomenclature; (2) use objective characterization and reporting of the harvest site, processing methods and cell delivery; (3) quantitatively and qualitatively characterize the injected cells; (4) use standardized patient-reported outcome measures of pain and function before and after treatment and (5) use high-quality imaging or other means for assessing structural outcomes [1,18]. Except for observations made in a recent editorial in the *Journal of Bone and Joint Surgery*, no reports have attempted to analyze and characterize the widening gap between enthusiasm (“hype”) and evidence supporting cellular therapy injections for musculoskeletal conditions [19]. Social media provides a view through a unique window of patient-directed and patient-generated content and allows us to understand how this therapy is advertised and viewed in today’s digital era, which is derived from and relayed to a broad audience [20].

The current state of cellular therapy in musculoskeletal medicine is at a crossroads. Marketing efforts are outpacing clinical evidence and regulatory control. Therefore, this study was an effort to report on the marketing of cellular therapy for musculoskeletal conditions by evaluating the content in popular social media channels. Specifically, media posts were evaluated for the following: (1) perspective (patient, friend, family, business or organization); (2) tone (positive, negative); (3) content (education, advertisement, research, media coverage or patient experience) and (4) visibility (number of hashtags applied per post).

Materials and methods

A search of posts on the public domains of Instagram and Twitter was performed on October 4, 2016. This search included public posts on each social media site during a 2-year time period from August 1, 2014–August 1, 2016. Picodash, a third-party web-based application, was used to retrieve the Instagram posts.

Twitter posts were obtained through the Advanced Search feature of their website. Although Facebook and LinkedIn search does not operate primarily through the use of hashtags, both platforms were searched. Facebook was analyzed for a single search term, “orthopedic cell therapy,” to capture content, and posts were analyzed for the following: media type (photo or video); tone (positive or negative); content (education, advertisement, research, media coverage or patient experience and engagement (number of likes, comments and shares on post)). Similarly, companies and groups on LinkedIn were searched using the term “orthopedic cell therapy” for corporate market sectors, number of employees, group type and number of members.

The dataset created from this study only contained de-identified information and institutional review board approval was not required.

Search term (hashtag) selection

A total of 28 unique hashtag search terms were assessed on Twitter and Instagram, as shown in Table I. Although not every user applies hashtags to a post, a hashtag analysis remains the only available option to systematically search social media content across various platforms and has been previously described

Table I. List of hashtags searched on Twitter and Instagram over the 2-year period.

Complete Hashtag Search
#celltherapy #arthritis
#celltherapy #bonemarrow
#celltherapy #cartilage
#celltherapy #ortho
#celltherapy #osteoarthritis
#mesenchymal #arthritis
#mesenchymal #bonemarrow
#mesenchymal #cartilage
#mesenchymal #ortho
#mesenchymal #osteoarthritis
#adipose #arthritis
#adipose #bonemarrow
#adipose #cartilage
#adipose #ortho
#adipose #osteoarthritis
#amniotic #arthritis
#amniotic #bonemarrow
#amniotic #cartilage
#amniotic #ortho
#amniotic #osteoarthritis
#stemcell #arthritis
#stemcell #bonemarrow
#stemcell #cartilage
#stemcell #ortho
#stemcell #osteoarthritis
#orthokine
#regenokine
#Regenexx

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