

Predatory Journals in Orthopaedic Surgery

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ABSTRACT

The prevalence of predatory journals in orthopaedic surgery continues to increase. These journals directly solicit authors, offering the advantages of open access and quick publication rates. Solicitation typically occurs in the form of e-mail communications, and the targets are usually identified as authors who have published other works in conventional publications. These predatory journals process manuscripts without peer review and plagiarism checks and often for a substantial publication fee. As a result, the scientific value of these publications is grossly suspect and has been considered a substantial threat to the quality of scientific discourse and scholarship. This affects not only the layperson reading the works but also investigators tricked into publishing in these venues. It has been estimated that several million US dollars per year are spent on these publications and, in many instances, using monies granted by agencies such as the National Institutes of Health. This review aims to study the types of solicitation, evaluate the increasing prevalence in orthopaedic surgery, and offer methods to authors and readers to identify these journals to mitigate their negative effects.

Predatory publishing is broadly defined as the for-profit publication of scientific content without the requisite checks and balances, such as peer review. These journals directly solicit authors, offering the advantages of open access and quick publication rates. This practice leads to a deviation from the accepted ethics and transparency in scholarly publishing. Predatory journals have become pervasive across various disciplines in the modern scientific community. This includes orthopaedic surgery, where the prevalence of predatory journals in orthopaedic surgery continues to increase.¹ A recent survey showed that only 40% of orthopaedic and trauma surgeons were aware of predatory journals, with the younger surgeons less familiar than their older cohorts.² Solicitation for these journals typically occurs in e-mail communications, and the targets are usually identified as authors who have published other works in conventional publications. These predatory journals process manuscripts without peer review and plagiarism checks, often for a nonsubstantial publication fee.³ Even if the paper is formally reviewed, experts in the field of study are generally not involved in the peer review process. Consequently, methodological biases, data

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interpretation, and conclusions are left unchecked and unchallenged.⁴ In addition, such manuscripts might become inaccessible as these journals fail to survive over time.⁵ Owing to the flawed peer review process and the lack of indexing and archiving practices, predatory journals have posed substantial threats to the integrity and merit of scientific publications.^{4,5} The circulation of readily accessible predatory literature to the general public and patients carries additional risks of misinformation and confusion as lay persons may not be able to discern whether a source is credible.^{6,7}

Although the prevalence of predatory journals in orthopaedic surgery is rising, it is essential to maintain and gain awareness of these practices among orthopaedic surgeons. This review aims to familiarize the orthopaedic community with predatory practices and present guidelines to help identify and circumvent these journals.

Historical Overview

The dissemination of scientific content has conventionally been subscription based. In this model, the reader is responsible for paying a fee to access a scientific journal or manuscript. Although most universities and research institutions in developed nations are capable of providing their students and faculty with access to journals and databases, individuals and institutions in developing countries find the costs of access prohibitive.⁸ The development of the internet heralded a new era in accessibility to information, given that online publication costs could be reduced substantially by maintaining content online and foregoing the costs of print.⁹ There was a growing social movement and philanthropic sentiment among international scientific circles and donors that scientific literature should be freely accessible to researchers and clinicians to accelerate global research and improve education.¹⁰

The open access (OA) journal model furthered this movement by shifting publication costs from the consumer to foundations, governments, and authors by charging an article processing charge (APC). In exchange for the APC, the publisher must ensure accessibility of the scientific manuscript to readers free of charge. Although open access publications began to appear online as early as the 1990s,^{11–13} in 2002, the Declaration of the Budapest Open Access Initiative became a formal call to provide free access to published research worldwide for the public good. In turn, this project popularized the development and creation of OA journals and the self-archiving initiative.^{9,14}

Although the OA journal model has had substantial successes, there have been some unintended consequences. With the new push for creating OA journals, the model became susceptible to exploitation as the inherent credibility checks of traditional publications were bypassed.⁸ Predatory journals found a method of taking advantage of scholars who were willing to incur APCs to have their research published.^{8,15} Predatory journals were incentivized to maximize the number of publications regardless of the quality of the content. Profits garnered from the APCs were proportional to the number of publications and the frequency at which they were published.¹⁶ These vulnerabilities in the OA model were exploited by several previously unknown journals that sprung up and began to solicit authors for submissions to their journals.¹⁷ A new global industry emerged that set out to profit from processing and publication fees in exchange for generally inadequately peer-reviewed OA publications.⁴

The rejection rates of prestigious journals create a market for newer journals. At the same time, career promotion increases the pressure to publish.^{15,18} Journals are now finding it harder to find qualified reviewers, which adds to the cost and time.¹⁹ A nonsustainable publisher might start compromising, which leads to dangerous predatory behaviors.

The predatory business model is fundamentally at odds with the values of the scientific community. It has become clear that the deceptive journal practices were corrupting open access journals by sacrificing the business, research, and publication ethics for financial gain.¹⁰ This large-scale issue was highlighted in 2010 by Jeffrey Beall,²⁰ who coined the term predatory publishers and recorded the first list of these publishers. Despite these concerns, the issue has persisted and thrived, given the difficulties in identifying and regulating predatory journals. By 2018, there were at least 225 potential predatory journals in orthopaedics alone, likely outnumbering legitimate journals.¹ Although most predatory e-mail solicitations are invitations to submit manuscripts to journals, invitations to become a member of an editorial board or to speak at a meeting have become increasingly common.^{16,21}

Principles of Transparency

In response to the increasing prevalence of predatory journals, a list of 16 principles in ethical, open access publishing was developed by the collaboration of the Committee on Publication Ethics, the Directory of Open

Table 1. Principles of Transparency and Best Practice in Scholarly Publishing

Principles of Transparency and Best Practice in Scholarly Publishing		
1	Website	Demonstrate high ethical and professional standards. It should include aims and scope, ISSN, etc.
2	Name of journal	The name should be unique to avoid misleading the authors and readers to confuse with another journal
3	Peer review process	The process should be clearly stated
4	Ownership and management	Information about the ownership and/or management of a journal shall be clearly indicated on the journal's website.
5	Governing body	The full names and affiliations of the journal's editorial board or other governing body shall be provided on the journal's website.
6	Editorial team/contact information	Journals shall provide the full names and affiliations of the journal's editors on the journal website and contact information for the editorial office, including a complete address.
7	Copyright and licensing	The policy for copyright shall be clearly stated in the author guidelines and the copyright holder named on all published articles.
8	Author fees	Any fees or charges shall be clearly stated in a place that is easy for potential authors to find before the authors begin preparing their manuscript for submission. If no such fees are charged, that should also be clearly stated.
9	Process for identification of and dealing with allegations of research misconduct	Publishers and editors shall take reasonable steps to identify and prevent the publication of papers where research misconduct has occurred, including plagiarism, citation manipulation, and data falsification/fabrication
10	Publication Ethics	A journal shall also have policies on publishing ethics.
11	Publishing schedule	The periodicity at which a journal publishes shall be clearly indicated.
12	Access	The way(s) in which the journal and individual articles are available to readers and whether there are associated subscription or pay-per-view fees shall be stated.
13	Archiving	A journal's plan for electronic backup and preservation of access to the journal content in the event a journal is no longer published shall be clearly indicated.
14	Revenue sources	Business models or revenue sources (eg, author fees, subscriptions, advertising, reprints, institutional support, and organizational support) shall be clearly stated or otherwise evident on the journal's website.
15	Advertising	Journals shall state their advertising policy if relevant, including what types of adverts will be considered
16	Direct marketing	Any direct marketing activities, including solicitation of manuscripts that are conducted on behalf of the journal, shall be appropriate, well targeted, and unobtrusive. Information provided about the publisher or journal is expected to be truthful and not misleading for readers or authors.

Principles of Transparency and Best Practice in Scholarly Publishing. 2022. Available at: <https://publicationethics.org/resources/guidelines-new/principles-transparency-and-best-practice-scholarly-publishing> Accessed April 29, 2022.¹⁸

Table 2. Warning Signs of Predatory Publishers and Journals

Warning Signs of Predatory Publishers and Journals	
1	The headquarter or exact location of the publisher is not stated.
2	The publisher’s address is either unsearchable or results in a residential or empty spot. ¹
3	The e-mail and the website contain several grammatical errors.
4	An extensive portfolio on the publisher’s website shows over 100 journal titles, whereas most are new or with no content.
5	Copyediting of the published papers is poor.
6	The e-mail addresses are from free providers such as gmail.com and yahoo.com
7	Review time is quoted as <1 month, and rapid publication is promised. ^{1,3}
8	To gain attention, the journal’s name contains a geographic origin, eg, British journal of, American journal of, or International Journal of.
9	The journal’s name contains a broad spectrum of topics, eg, The Journal of Engineering, Management, and Humanities.
10	E-mails contain a yellow highlighted text of call for papers
11	APCs are below \$500, whereas the legitimate journals are usually >\$2,000. ^{1,3}
12	Claiming falsified impact factors, including Index Copernicus Value
13	Statement of being indexed on the DOAJ, but they are not.
14	Requesting to submit the manuscript via e-mail rather than online submission.

APC = article processing charge, DOAJ = Directory of Open Access Journal

Access Journals, the Open Access Scholarly Publishers Association, and the World Association of Medical Editors (Table 1).²² For example, one item emphasizes that the journal’s name should be unique to avoid misleading the authors. The hijacked journals pretend to be legitimate journals by using the exact or similar words in the title to target the contributors and generate a financial gain. Occasionally, two competitor publishers may target their contributors by launching journals with similar names.²³ Another item emphasizing transparency refers to the author fee, which must be clearly stated and easily accessible even if no fees are charged. The business models or revenue sources such as author-based, subscription-

based, advertising-based, reprints, institutional support, and organizational support are all legitimate as long as they are clearly stated.²² E-mail solicitations referring to the Direct Marketing Activities are accepted practice for a legitimate publisher as long as the e-mail content is transparent, appropriate, and unobtrusive.

Predatory Publication in Orthopaedics and Musculoskeletal Care

Over the past decade, legitimate journals and predatory publications have been studied in various disciplines.^{12,24}

Table 3. Sources to Check the Authenticity of the Journals’ Claim

Source	Website
Check the journal title on PubMed	https://www.ncbi.nlm.nih.gov/nlmcatalog
Check the journal title on the DOAJ	https://doaj.org/
Check the journal title on Beall’s list	https://beallslist.net/#update
Check the journal title on Web of Science (ISI)	https://mjl.clarivate.com/
Check for the journal rank on Scimago (Scopus)	https://www.scimagojr.com/journalrank.php
Checklist to verify the journal or publisher	https://thinkchecksubmit.org/
Appropriate journal finder—PubMed	https://jane.biosemantics.org/
Appropriate journal finder—Web of Science	https://mjl.clarivate.com/home

Table 4. Checklist of the Journal's Website Before Accepting the Editorial Board Membership

Checklist of the Journal's Website Before Accepting the Editorial Board Membership	Yes	No
Is the grammar and spelling correct?	—	—
Does the URL appear to be unique and legitimate?	—	—
Does the website look professional and/or academic without flash media?	—	—
Are there original photographs or images?	—	—
Are full-text articles available in the archives going back to the date the journal began publishing?	—	—
Is the subject of the published articles (even in publications with broad scopes) topically related in some way?	—	—
Is there a verifiable physical address and phone number?	—	—
Can you confirm that there is more than one employee or representative in the company?	—	—
Can you search content easily without registering?	—	—
Does the published content fit within the scope of the journal?	—	—
Is there a named Editorial Board?	—	—
Can you verify identities, backgrounds, and/or publications of the members of the Editorial Board?	—	—
Are the instructions for the authors detailed and adequate (eg, detailed retraction policy, archiving, copyright, and process for acceptance and review)?	—	—
Is publication presented as a possibility rather than a guarantee?	—	—
Is the publication schedule clear and consistent?	—	—
Has a named Editor in Chief consistently published editorials?	—	—
Does the site provide a submission portal, rather than submission via e-mail?	—	—

Lopez E, Gaspard C. Conference Assessment Tool (Version 1). 2018 Available at: <https://guides.himmelfarb.gwu.edu/PredatoryPublishing/EvaluatingJournals>.

However, there are relatively little published original data on predatory publications pertaining to orthopaedics. Although the prevalence of predatory journals in orthopaedic surgery is rising, the orthopaedic community's familiarity with this entity may be deficient.^{1,2,25} Despite the increasing number of predatory behaviors in certain parts of the world, it does not appear that there has been a commensurate increase in the number of surgeons publishing in these journals.^{18,25}

A study reviewing publications of French orthopaedic surgeons between 2008 and 2017 found that only 0.55% of French orthopaedic scientific output had been published in the confirmed predatory journals.²⁵ Moreover, the APCs for these papers averaged about \$400. Submission to these journals was attributed to the lack of awareness about the existence of such journals.²⁵

In an online survey to assess the knowledge of predatory journals among 291 orthopaedic and trauma surgeons in Germany in 2019, only 40% of surgeons were aware of predatory behaviors.² Moreover, 21% were aware of the DOAJ acting as a registry of legitimate, open access journals. A higher level of profession and history of being listed as the first, last, or corresponding author was significantly associated with predatory behavior awareness.²

A study on orthopaedic publications originating from Turkey in the predatory journals between 2000 and 2018 showed that 2.2% of these articles were from Turkey, with an average APC of \$865.¹⁸ These journals were not listed on the Web of Science. Interestingly, the authors assessed the correlation between the number of these publications and the academic incentive regulation in 2015, which resulted in a 4.8-fold increase in predatory journal publishing. Moreover, after the associate

Table 5. Checklist for Meeting Invitations

	Checklist for Meeting Invitations	Yes	No
1	Is the conference sponsored by a reputable association?	—	—
2	Is the sponsor involved in any scholarly activity other than facilitating conferences?	—	—
3	Do you know anyone who has attended or presented at the conference?	—	—
4	If you speak or present, are the conference fees waived?	—	—
5	Can you easily identify the venue?	—	—
6	Is this a long-running, established conference?	—	—
7	Are the registration and other fees clearly outlined?	—	—
8	Are you familiar with previous proceedings for that specific conference?	—	—
9	Is the conference itinerary clear and easily accessible?	—	—
10	Can you identify any of the speakers from previous conferences as experts in your field?	—	—
11	Is the conference location in context with the content and/or sponsor?	—	—
12	Is the subject matter related to your field of expertise?	—	—
13	Is the subject matter of the conference focused and specific to a field, type of study, etc.?	—	—

Lopez E, Gaspard C. Conference Assessment Tool (Version 1). 2018 Available at: <https://guides.himmelfarb.gwu.edu/PredatoryPublishing/EvaluatingJournals>.

professorship criteria changed in 2016, there was a 3.3-fold increase in the number of publications in the predatory journals, which shows the direct influence of publication obligation.¹⁸

A study by Yan et al,¹ published in 2018, identified 104 suspected predatory publishers representing 225 possible predatory orthopaedic or musculoskeletal journals based on Beal’s list. One journal was indexed in the DOAJ, and 20 were indexed in PubMed, indicating that indexing in these well-respected databases does not protect from the reaches of predatory publishers. Like other specialties, the median APC was lower for predatory journals (\$420) than legitimate journals (\$2,900). These lower costs are more appealing to authors worldwide but may be even more appealing to those from lower-income countries.

The distribution of the predatory orthopaedic journals revealed that 56% are based in the United States, 14% in India, 7% in the United Kingdom, and 3% in Canada.¹ This study implies that the country of origin does not necessarily indicate legitimacy because the web-based nature of the publishing business allows the imposters to take advantage of an address in a developed country to be more appealing to the authors while the staff is mainly located in a developing country.^{1,16}

Investigating the office location of the suspected predatory journals often reveals an empty, residential, or unsearchable address.¹ Notably, this study used Beal’s list for the predatory publishers, which was determined based on highly rigorous criteria, although the journals by these publishers are considered legitimate.

The highest number of orthopaedic articles published in the predatory journals was from India (2,353 articles) and the United States (1,496 articles).¹ Potentially unauthorized images were used on 63% of predatory journals, 6% of legitimate open access, and 3% of subscription-based journals.³ The pressure to publish for career advancement has been linked to a drive for increased submission, which is usually rejected by high-ranked journals. This pressure leads to a higher chance of research misconduct and the creation of a market for lower-quality journals.

How to Recognize Predatory Publishing Practices

Many efforts have been made to boycott predatory journals and publishers, but, in fact, it is impossible. We cannot consider all OA journals equal, but there is a

range of defined predatory behaviors that even potential legitimate OA journals might fall into. A simple classification divides these journals into three groups based on Publish, Peer review, and Academic value.¹⁶ Group 1 publishes the paper after a rapid non-peer review, but there is no academic value. Group 2 publishes the paper without review, and there is no academic value. Group 3 journals do not even publish the paper, have no review, and have no academic value.¹⁶

Beall²⁶ published the criteria for determining predatory open access journals in four categories: Editor and Staff, Business Management, Integrity, and Poor journal standards. Although it serves as an aid, the study of 81 legitimate open access and legitimate non-open access academic journals showed that 45 journals failed in at least one of Beall's criteria, and 18 failed in two or more. The top failed criterion in 22 journals was the business management item (questionable policies for digital preservation, meaning that if the journal stops operations, all content disappears from the internet). This study questions Beall's criteria validity because even the traditional model journals might fall into the predatory category.²⁷

Dadkhah and Bianciardi published their criteria in 2016, including 14 items spread in four domains of Editorial member's criteria, Review process and publishing, Announcements, and OA policies and publication charges. The predatory rate (PR) is calculated by dividing the sum of the items by 14 total items. $PR > 0.22$ is considered a predatory journal, $0 < PR < 0.22$ is deemed predatory practice, and $PR = 0$ is nonpredatory. This cutoff value is determined by testing 80 predatory and 70 legitimate journals.²⁸

Although several classifications score numerous items, all share one common concept of transparency. As mentioned earlier regarding the principles of transparency, it can be considered a single criterion to distinguish a legitimate from a predatory practice. Nevertheless, some warning signs quickly draw attention to more due diligence before trusting a journal (Table 2).¹⁶

Advice Toward the Threats

Obviously, there is no clear boundary between predatory and legitimate journals, but a range of behaviors propels a journal toward either one.²⁹ It is the author's responsibility to be vigilant and check the resources for the authenticity of the information and eventually decide to trust. We recommend that the authors check different resources to test the authenticity of journal

statements. Moreover, there are available journal finders provided by organizations or publishers to match the author's paper to the most suitable legitimate journal (Table 3).

We are bombarded with automatic e-mail solicitations that, fortunately, are going directly into the spam folder. Our impression is that Beall's list of predatory publishers is too sensitive, and publishers are assumed predatory unless otherwise proved. The other verification processes seem time consuming and puzzling, especially for a novice researcher. The shortcoming is the lack of attempts by academic institutions to raise awareness of this issue in their trainees, which can be pursued by adding it as a subject as part of the introduction to the research component of the curriculum.

Conclusion

The desire and eagerness to positively impact the field of orthopaedics and contribute to its progress should be tempered by the understanding that an adequate peer review process will take months to conduct to vet and strengthen the quality of the research project.³⁰ Younger and inexperienced researchers, medical students, interns, residents, or even attending surgeons not familiar with scholarly publishing may find themselves in the crosshairs of these predatory journals due to their lack of familiarity with the predatory models. One way to tackle the issue is for scholars to resist the temptation to publish quickly and easily.

With the number of journals ever increasing, the question of whether a journal can be trusted arises. Practically speaking, if a scholar is inclined to investigate whether a journal is predatory in nature, they may find themselves navigating through a labyrinth of unfamiliar journal webpages with unfamiliar editorial boards and trying to answer checklists to help guide their decision. This may not be an efficient use of an academic surgeon's time, especially when an abundance of well-established conventional and legitimate open access journals is available. Furthermore, an exhaustive investigation of the editorial board and the qualities of a suspected predatory journal may not result in any definitive conclusions about whether the journal is legitimate or predatory. If an author is inclined to publish in an open access journal and has the funds to do so, it is recommended that the researcher follow the checklists outlined in Table 3. This also applies to editorial board invitations or suspected predatory conferences (Tables 4 and 5).

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