Collaborative multicenter trials in Latin America: challenges and opportunities in orthopedic and trauma surgery

Estudos colaborativos na América Latina: desafios e oportunidades em cirurgia ortopédica e traumatológica

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ABSTRACT

CONTEXT AND OBJECTIVE: Orthopedic research agendas should be considered from a worldwide perspective. Efforts should be planned as the means for obtaining evidence that is valid for health promotion with global outreach.

DESIGN AND SETTING: Exploratory study conducted at Universidade Federal de São Paulo (Unifesp), São Paulo, Brazil, and McMaster University, Hamilton, Canada.

METHODS: We identified and analyzed collaborative and multicenter research in Latin America, taking into account American and Canadian efforts as the reference points. We explored aspects of the data available from official sources and used data from traffic accidents as a model for discussing collaborative research in these countries.

RESULTS: The evaluation showed that the proportion of collaborative and multicenter studies in our setting is small. A brief analysis showed that the death rate due to traffic accidents is very high. Thus, it seems clear to us that initiatives involving collaborative studies are important for defining and better understanding the patterns of injuries resulting from orthopedic trauma and the forms of treatment. Orthopedic research may be an important tool for bringing together orthopedic surgeons, researchers and medical societies for joint action.

CONCLUSIONS: We have indicated some practical guidelines for initiatives in collaborative research and have proposed some solutions with a summarized plan of action for conducting evidence-based research involving orthopedic trauma.

KEY WORDS:
Multicenter study [publication type].
Fractures, bone.
Traumatology.
Orthopedics.
Latin America.

RESUMO

CONTEXTO E OBJETIVOS: A programação de pesquisa em ortopedia deve ser considerada do ponto de vista global. Esforços devem ser planejados como forma de se obter evidência que seja válida para promoção da saúde de alcance mundial.

TIPO DE ESTUDO E LOCAL: Estudo exploratório conduzido na Universidade Federal de São Paulo (Unifesp), São Paulo, Brasil e na McMaster University, Hamilton, Canadá.

MÉTODOS: Identificamos e analisamos pesquisas multicênticas/collaborativas realizadas na América Latina, considerando os esforços nos Estados Unidos e Canadá como referência. Para tal, exploramos os aspectos dos dados disponíveis em fontes oficiais e utilizamos os dados provenientes de acidentes de trânsito como modelo de discussão de pesquisas colaborativas nestes países.

RESULTADOS: A avaliação demonstra uma pequena proporção de estudos colaborativos/multicéntricos em nosso meio. Análise breve demonstrou que existe enorme proporção de mortes devidas a traumas provenientes dos acidentes de trânsito. Dessa forma, parece-nos claro que iniciativas envolvendo estudos colaborativos são importantes para a definição e melhor entendimento do padrão das lesões provenientes de trauma ortopédico e as formas de tratamento. A pesquisa ortopédica pode ser importante ferramenta para aglutinar cirurgiões ortopédicos, pesquisadores e sociedades médicas para uma ação em conjunto.

CONCLUSÕES: Apontamos algumas diretrizes práticas para iniciativas em pesquisas colaborativas e propusemos algumas soluções com um plano de ação resumido para a realização de pesquisa baseada em evidências envolvendo trauma ortopédico.
INTRODUCTION
Research attitudes should consider a worldwide scenario and be
guided to improve patient health outcomes. Orthopedic sur-
gery should also follow this approach. Illness due to orthopedic
trauma is increasing in low and middle-income countries and
should not be underestimated, since recent reports call this an
“injury epidemic” that is far from being under control.

As economic status strengthens in developing coun-
tries, individual incomes increase. This can lead to develop-
ment of an unbalanced situation involving greatly increased
use of motorized vehicles coupled with a lack of infrastructure
and adequate road traffic policies to support this increase.
This has led to increasing rates of disability and deaths due to
road traffic trauma.

Data summarized in the United Nations-supported First
Global Ministerial Conference on Road Safety, which was held in
Moscow, depict road traffic as a major cause of death for people
aged between 5 and 29 years. It is well known that 90% of these
deaths occur in low or middle-income countries. For Latin
America, these data are sound. Trauma is a leading cause of death
among boys and girls aged 5-14 years, as well as among economi-
cally adult men and women.

Orthopedic fracture demographics possibly follow this
disturbing situation because environmental and lifestyle
modifications may lead to injury patterns of greater sever-
ity. Unfortunately, no data from the orthopedic community on
such injuries is available.

This scenario suggests that collaborative multicenter stud-
ies would probably be the best tool that could be used to promote
worldwide comprehensive research efforts within the orthopedic
trauma setting. Such a research initiative would probably be the
most effective tool for promoting evidence on a worldwide basis.
It would be comprehensive because the trauma burden for different
geographical areas would be included. Also, it would be strong with
regard to the external validity of the results because of planning for
wide-reaching promotion of orthopedic evidence-based research.

Examples of success in multi-collaborative research are wide-
spread in non-orthopedic research. A comparative analysis
conducted on studies published in 2009 demonstrated that up to
40% of the research published in highly-cited clinical journals,
such as the New England Journal Of Medicine, Journal of the
American Medical Association and Lancet, is produced through
collaborative efforts.

Clinical studies are more prone to have a higher number of
institutions involved, and this has led to inclusion of higher num-
ber of participants in research reports. It is also true that straight
comparisons in clinical research are not always reasonable, since
some of them are produced through large drug industry-spon-
sored trials and are part of the unavoidable process for achieving
clearance from the United States Food and Drug Administration
(FDA). In this respect, the orthopedic research scenario is simi-
lar to other surgical specialties, such as gynecology and obstetrics
and ophthalmology.

OBJECTIVES
The aim of this study was twofold: 1) to explore data from the
published literature and official records from trusted organiza-
tions, pointing out the potential for conducting collaborative mul-
ticenter trials in Latin America; and 2) to discuss and present a
rationale for research actions to be undertaken in Latin America.

METHODS
Data exploration: collaborative research as an opportunity
to generate research in Latin America

For this exploratory analysis, we conducted a non-pragmatic
Medline-based search strategy with the aim of finding collabora-
tive research data. We conducted a search for randomized con-
trolled trials within orthopedics and trauma (O&T) surgery, while
focusing on two geographically and economically distinct groups:
1) Latin American countries; and 2) North American countries.

RESULTS
In Table 1, we show the search strategy used and the studies
retrieved. By analyzing the titles and abstracts, we also identi-
fied the studies reporting collaborative or multicenter research
(Table 1 and Figure 1).

These data show that there was a discrepancy in conducting
high-level orthopedic-focused randomized trials, over a 2.5-year
period, thus leading to an approximately fourfold difference in
published randomized trials over that period. This is certainly
not precise data, but it demonstrates the lack of high-quality
research currently available.

<table>
<thead>
<tr>
<th>Search strategy</th>
<th>Studies retrieved</th>
<th>Orthopedics – after analysis</th>
<th>Collaborative studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ((Orthopedic Surgery) OR orthopedic surgery [MeSH Terms]) OR fracture fixation [MeSH Terms]</td>
<td>600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Brazil OR Venezuela OR Argentina OR Colombia OR Peru OR Mexico</td>
<td>1276</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. United States of America OR Canada</td>
<td>8110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. 1 AND 2</td>
<td>11</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>5. 1 AND 3</td>
<td>40</td>
<td>26</td>
<td>14</td>
</tr>
</tbody>
</table>

Limits: 2010-2012 (May), PubMed filter for randomized controlled trials.
Data gathered from the SCOPUS database are also sound (www.scimagojr.com). These show that there are discrepancies in the rates of published articles from 1996 to the present day and in the proportion of collaborative studies (not only randomized trials), for orthopedics and sports medicine (Figures 2 and 3).

These comparisons were made considering United States, Canadian and Latin American data. Large volumes of research have been published in the United States, with a growth trend that is greater than the Latin American or the Canadian trend. With regard to the percentage of collaborative studies, the interpretation might be misleading for United States data, since the high absolute number of published papers might be responsible for the proportional drop in participation in collaborative studies.

Economic and demographic characteristics should be taken into consideration in analyzing these results. For example, the data in Table 2 shows that there is some equivalence of the populations for Latin America and North America, while there is a six to tenfold disproportion in country incomes. These points probably jeopardize some of the research initiatives, such as funding barriers and lack of infrastructure.

Some good-quality Latin American research might be underreported or might be unreachable through our methodology. Nonetheless, systematic assessments for Latin American databases have shown that no extensive good-quality orthopedic research was published even after 2000.12,13

The burden of road traffic accidents: a model for discussing the importance of orthopedics and traumatology research

The total Latin American population is around twice the populations of the United States and Canada combined. Developing
Table 2. Rates of fatal and non-fatal injuries in the Americas

<table>
<thead>
<tr>
<th>Country</th>
<th>Population</th>
<th>Gross national income per capita (US$)</th>
<th>Rate of RTF (10^3 scale)</th>
<th>Rate of non-fatal injuries (10^3 scale)</th>
<th>Trends in road traffic deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>305,826,246</td>
<td>46,040</td>
<td>0.14</td>
<td>10.81</td>
<td>Decreasing</td>
</tr>
<tr>
<td>Brazil</td>
<td>191,790,929</td>
<td>5,910</td>
<td>0.18</td>
<td>2.13</td>
<td>Stable</td>
</tr>
<tr>
<td>Mexico</td>
<td>106,534,880</td>
<td>8,340</td>
<td>0.16</td>
<td>5.67</td>
<td>Stable</td>
</tr>
<tr>
<td>Colombia</td>
<td>46,155,958</td>
<td>3,250</td>
<td>0.12</td>
<td>0.84</td>
<td>Decreasing</td>
</tr>
<tr>
<td>Argentina</td>
<td>39,531,115</td>
<td>6,050</td>
<td>0.10</td>
<td>4.41</td>
<td>Increasing</td>
</tr>
<tr>
<td>Canada</td>
<td>32,876,047</td>
<td>39,420</td>
<td>0.09</td>
<td>6.06</td>
<td>Decreasing</td>
</tr>
</tbody>
</table>

RTF = road traffic accidents.

Figure 4. Map of Latin America showing population and absolute numbers of road traffic injuries according to legend bar depicting country populations. Absolute numbers of road-traffic fatalities are superimposed on each country that was assessed regarding road traffic accidents, from top to bottom: Mexico, Colombia, Brazil and Argentina. Data gathered from World Health Organization reports.
countries such as Brazil, Mexico, Colombia and Argentina are probably experiencing the same injury trends that are reported in India and China.3,4,14

Injuries due to road traffic accidents (which include motorcycle, car and pedestrian accidents) might be underreported, since non-fatal injuries are more prone to be underestimated in lower income countries.15 Despite the well-known explicit nature of unrefined data, little is known about the real picture of orthopedic trauma injuries in Latin America (such as fracture patterns and treatment facilities and types), given that no comprehensive observational report is available. The orthopedic research community should focus some effort on this area.

In Figure 4 and Table 2, we demonstrate the importance of incorporating Latin American data across all research disciplines by taking the ubiquitous example of road traffic accidents. Latin America contains highly populated countries with high proportional rates of road traffic deaths and impairment.

**DISCUSSION**

**A call for action for Latin America: comments**

The proposal to carry out orthopedic research as a collaborative endeavor is challenging, and this has been well stated in some comprehensive discussions on this issue.16,17 Three years ago, a symposium supported by the American Academy of Orthopedic Surgeons (AAOS), the Orthopedic Research and Education Foundation (OREF) and the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) took this worldwide endeavor into account with regard to evidence.17

Different authors have pointed out what they judge to be the key factors that can lead to limitations or failure of a clinical trial project. These authors have identified the following relevant factors: cultural issues, investigator skills, academic barriers, infrastructure deficits, data management, institutional review board issues, trial regulation and funding.17

Although collaborative studies are more likely to be planned as randomized controlled trials, researchers should also consider assessing orthopedic issues through observational studies.18 In particular, observational studies could prove very useful for exploring research questions that are important today, and for gathering epidemiological data for public health initiatives.18

In Table 3, we have tried to summarize a rationale for action in Latin America.

**REFERENCES**


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