Gea review of Brazilian journal publications on orthopaedics and sports medicine

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ABSTRACT

The purpose of this review is to present the most relevant articles on orthopaedics and sports medicine published in Brazilian non-orthopaedic medical journals indexed by ISI. These papers represent the most important contributions to this area of knowledge over the last two years. A total of thirty-eight papers were located for this period, published in different Brazilian journals and with different research designs. It is clear that better divulgation of papers on orthopedics and sports medicine in general journals is needed, to give specialists a better source of reference and research.

Keywords: Orthopedics. Sports medicine. Publication

INTRODUCTION

The production of better scientific articles in the orthopaedics and sports medicine areas entails the demand for publications of impact for the dissemination and internationalization of knowledge. From this perspective, the possibility of publication in magazines recognized and indexed by the ISI may become a bottleneck for national publication, causing many authors to end up seeking foreign magazines, even those of poor disclosure in our environment, in pursuit of higher academic scores for their work. This reality is complex, as it includes the counterpart of limited disclosure of local surveys in our environment, and often more applicable in our country than abroad. The possible solution to this perverse equation involves qualification by international criteria of quality publications from our environment, seeking to attain the virtuous circle of the best magazines that receive the best articles and can be more selective, improving their quality and impact and thus attracting increasingly refined publications.

In our environment, only one magazine specialized in orthopaedics has yet been qualified by the ISI, and even this situation is very recent. This means that even orthopedists that propose to publish in our environment end up seeking general magazines of good impact for their publications, reducing their disclosure in the Brazilian orthopedic field.

With this issue we sought to study the profile of two-year publications with an interest in orthopedics and sports medicine, in four Brazilian journals currently indexed by the ISI.

METHOD

A survey was conducted in the years 2007 and 2008 on articles of possible orthopedic interest published in four Brazilian periodicals, currently catalogued in the ISI (São Paulo Medical Journal, Revista da Associação Médica Brasileira, Clinics) or soon to be catalogued (Revista Brasileira de Medicina Esportiva.) The articles were separated by magazine and by research design. The results were presented in tables.

RESULTS

A selection was made of 42 articles relating to orthopedics and sports exercise medicine. The distribution by magazine is presented in Table 1.

DISCUSSION

The analysis of table 1 shows us a strong trend toward publication in Clinics and in Revista Brasileira de Medicina Esportiva, to a lesser extent in the São Paulo Medical Journal and even less in Revista da Associação Médica Brasileira. This trend can be partly understood, in relation to Revista Brasileira de Medicina Esportiva, by the important interface among specialties that it attracts and broadcasts publications of a good level from both areas.

In the case of Clinics we can imagine as factors of appeal the relative editorial agility of the magazine that allows communication and publication of articles in relatively short timeframes (around 6 months), which is highly convenient for the researcher.
Table 1: Distribution of articles by magazines

<table>
<thead>
<tr>
<th>Magazine</th>
<th>Number of articles</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sao Paulo Med J</td>
<td>06</td>
<td>14.28%</td>
</tr>
<tr>
<td>Rev Assoc Med Bras</td>
<td>01</td>
<td>2.38%</td>
</tr>
<tr>
<td>Rev Bras Med Esporte</td>
<td>14</td>
<td>33.33%</td>
</tr>
<tr>
<td>Clinics</td>
<td>21</td>
<td>50.00%</td>
</tr>
</tbody>
</table>

Table 2: Distribution of articles by research design

<table>
<thead>
<tr>
<th>Type of design</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Trial</td>
<td>11</td>
<td>26.19%</td>
</tr>
<tr>
<td>Transversal Study</td>
<td>13</td>
<td>30.95%</td>
</tr>
<tr>
<td>Revision</td>
<td>10</td>
<td>23.80%</td>
</tr>
<tr>
<td>Series of Cases</td>
<td>3</td>
<td>7.14%</td>
</tr>
<tr>
<td>Cohort</td>
<td>1</td>
<td>2.38%</td>
</tr>
<tr>
<td>Case presentation</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>2</td>
<td>4.76%</td>
</tr>
<tr>
<td>Adaptation of questionnaires</td>
<td>2</td>
<td>4.76%</td>
</tr>
<tr>
<td>Systematic Revision</td>
<td>1</td>
<td>2.38%</td>
</tr>
</tbody>
</table>

We should also emphasize the institutional proximity to Hospital das Clínicas da FMUSP, an important source of scientific production, including in orthopedics and sports medicine. The lower demand for the São Paulo Medical Journal and Revista da Associação Médica Brasileira evidences possibilities of incorporation of improvements in the guidance of researchers that, once better informed, could divide their publications in a more equitable manner and in editorial agility, a considerable stimulus for the receipt of publications of growing quality. The analysis of table 2 makes it clear to us that the articles published by these four magazines stand out in terms of production quality.

The absence of presentations of isolated cases, common in other kinds of publication, the majority participation of clinical trials and transversal studies, publications of acknowledgedly higher academic quality, can mark the assertion that they are elite publications in our environment, compatible with magazines in a phase of growth of impact that start to receive increasingly better articles in the aforementioned virtuous circle. It is obvious that the path to the improvement of publications in Orthopedics and Sports Medicine, which is already in progress, depends more and more on better articles and more agile magazines.

CONCLUSION:

Along with a greater disclosure of publications in Orthopedics and Sports Medicine in general periodicals, there is an evident improvement of the efficiency and editorial agility of magazines focused on orthopedics providing specialists with a larger source of references and research.

APPENDIX

Pinheiro et al. concluded that tumor cells in Hodgkin's disease (HD) express cell proliferation markers that are evaluated according to the oncogenes involved or the expression of their proteins. Correlations between the protein expression grade and clinical data are now important for disease prognosis.

Belloti et al. conducted a cross-sectional study, during the 34th Brazilian Congress of Orthopedics and Traumatology, São Paulo (SP) concluding that Brazilian orthopedists have concordant opinions regarding conservative treatment methods and the use of bone grafts. There were conflicting opinions regarding surgical treatment methods, classification types and complications.

Benseñor et al. demonstrated that estimated hemoglobin value is more accurate by the physical examination than evaluation by the four-level method, considering the automatic measure of hemoglobin as gold standard. Clinical experience does not improve the anemia diagnosis.

Cicarelli et al. concluded that early treatment with dexamethasone reduced the seven-day mortality among septic shock patients and showed a trend towards reduction of 28-day mortality. Ribeiro et al. hope to suggest methodologies that will enable physicians to promote regular physical activity at appropriate levels, ensuring various benefits for the individual over the short, medium and long terms, which determines their importance in the promotion of health. On the other hand, sedentary behavior has reached alarming levels among the general population, which qualifies it as a serious health problem of endemic proportions. Thus we hope to help physicians use counseling as a means for improving the health of the population.

Gawryszeski analyzed data on deaths by injuries for the State of São Paulo, 2003. Intention and mechanism of injuries varied according to the victim’s age. These data indicate a need to develop injury prevention strategies, considering the differences that exist among age brackets as concerns injury intent and mechanism. Special attention should be paid to homicides and to motor vehicle accidents. Fatal injuries are an important public health issue in the State of São Paulo. Each year around 32,000 people are killed and 180,000 are hospitalized due to injury.

Grieger analyzed the e-commerce of scientific papers and the means by which these services are offered. Concluding that the e-commerce of scientific papers is a fact which can negatively interfere in the ethical, scientific and professional development of undergraduate and graduate students, as well as in scientific production by adulterating data and information found in literature. A new approach is recommended, especially when evaluating final essays.

Vital et al. concluded that the practice of sports by Paraolympic athletes, due to the intensity of efforts in the attempt to excel, causes trauma-orthopedic lesions, recommending early diagnosis and treatment, besides strengthening the athletes’ preventative measures.

Fonseca et al. assessed 25 professional soccer players, analyzing the validity of 11 anthropometric equations through the statistical procedures: Pearson correlation (r), dependent t-test, constant error (CE), total error (TE) and estimated standard error (ESE), using hydrostatic weight as the gold standard technique.
They concluded that the equations proposed by Jackson and Pollock are valid for estimating the body density of professional soccer players, since the other equations analyzed in this study present considerable errors in their estimation.

Pelargo et al.\textsuperscript{10} verified the effect of aerobic performance level on the relationship between the technical indexes corresponding to critical speed (CS) and maximal speed of 30 minutes (S30) in swimmers. The correlations (r) between CS and S30 and the technical variables corresponding to the two speeds were significant in all comparisons (0.68 to 0.91). Thus, the relationship between the speed and technical variables corresponding to CS and S30 was not modified by the aerobic performance level.

Fonseca et al.\textsuperscript{11} They conducted a descriptive analysis of parameters related to muscular performance in professional soccer athletes. The results of this study characterize the profile of professional soccer players relative to their capacity for producing torque, maximum work and mean power. Moreover, significant differences were observed between legs in some variables. The established normative data can be used as reference values in the prevention, training and rehabilitation of athletes, besides serving as a reference for future studies with the objective of testing the association between muscular performance and incidence of injuries in soccer practice.

Arena et al.\textsuperscript{12} studied the medical structure of health care services of 20 clubs from São Paulo with the incidence of sports injuries found in young basketball, indoor soccer and volleyball players. They identified 343 sports injuries or 1.7 injury/athlete/year. Only eight of the twenty clubs evaluated had specialized medical care inside the institution. In basketball, there was no statistical relationship between rates of injury and clinical monitoring in the club. In indoor soccer and volleyball, the rate of injuries was higher with clinical monitoring, as the injuries of less severity are not detected in clubs without a physician. The study suggested restructuring in the medical care offered to young athletes.

Bertolla et al.\textsuperscript{13,14} verified the effect on flexibility caused by a Pilates\textsuperscript{\textregistered} program in an under-20 indoor soccer team (17-20 years), and proved that the training protocol with the Pilates\textsuperscript{\textregistered} method employed by the researchers served to increase the flexibility of the U-20 indoor soccer players.

Base et al.\textsuperscript{14} studied the occurrence of injuries reported by Brazilian professional surfers, who participated in the Brazilian circuit. They found 112 injuries among all the study participants, and concluded that most injuries occurred during maneuvers, in contact with the board and with the seabed, suggesting that the extrinsic factors inherent to this sport are potentially harmful to athletes.

Sousa et al.\textsuperscript{15} compared the electromyographic activity (EMG) of the rectus femoris, biceps femoris, tibialis anterior and soleus muscles in squatting, associating the trunk in upright position with two angles of knee flexion (40° and 60°) and the trunk at 45° flexion with three angles of knee flexion (40°, 60° and 90°). Trunk position and the additional load of 10 kg influenced the muscular activation of the femoris rectus at 60° of knee flexion, in which the erect trunk provided more activation. The biceps femoris presented greater activation when the knee was at 40° of flexion, and the trunk flexioned. The co-activation between the rectus femoris and biceps femoris with the trunk in flexion, and between the rectus femoris and soleum in the other positions, lead to new possibilities of exercises in rehabilitation.

Artioli et al.\textsuperscript{16} discuss genetic doping, which should be initiated in the academic and sports fields, in order to study prevention, control and detection measures of gene doping, thus avoiding future problems regarding the misuse of this promising therapy. Menon et al.\textsuperscript{17} compared weight and length adaptations of the soleus muscle in rats, besides the total estimate of the sarcomeres in series, when submitted to intermittent stretching during immobilization in plantarflexion. They concluded that stretching during immobilization preserved muscular length and the amount of sarcomeres in series, but did not prevent muscular weight loss.

Ribas et al.\textsuperscript{18} studied the angular variables of the knee and ankle during gait in water, and compared them with gait on land. The angular variables analyzed presented significant differences in water when compared with those on land. The results found contribute to a better understanding of this activity in the context of training and rehabilitation.

Gerage et al.\textsuperscript{19} analyzed the impact of a 16-week weight training (WT) course on blood pressure (BP) in normotensive women. An interaction of group vs. momentum was found in the systolic, diastolic and mean BP values, with significant decreases, during the 16 weeks of follow-up, of 5, 8 and 6mmHg, respectively, in the TG. The outcomes suggest that the 16 week-WT program may cause important reductions in BP in young, normotensive and previously untrained women.

Rodrigues et al.\textsuperscript{20} verified the effect of aerobic physical fitness on the psycho physiological response to laboratory stressors in Brazilian army officers. The results suggest that individuals with better cardiorespiratory fitness tend to present reduced patterns in autonomic response to stress, as shown by the behavior of the levels of conductibility on the skin. Stress, at the same time as it promotes human adaptation to different situations, at high levels or if maintained for long periods, may produce consequences for the body, leading to several health conditions. Exercise practice as well as high cardiorespiratory fitness seems to protect the body against these undesired stress effects.

Dore et al.\textsuperscript{21} investigated the prevalence of painful symptoms as well as the associated factors in professional ballet dancers and verified high prevalence of pain in professional dancers performing in the main capitals of the Brazilian northeast. The most recurrent region was the lumbar, observing great interference of painful symptoms in several activities of personal life as well as work of this population.

Shinjo et al.\textsuperscript{22} translated and adapted the Bath Ankylosing Spondylitis Methodology Index (BASMI) – a metrological measurement for the assessment of patients with ankylosing spondylitis to Brazilian Portuguese besides evaluating the applicability of this questionnaire, which proved to be an applicable instrument for analyzing the mobility index of Brazilian patients with ankylosing spondylitis.

Portes et al.\textsuperscript{23} evaluated torque and the hamstring/quadriceps ratio of the knee of long distance runners with and without anterior cruciate ligament laxity and concluded that this laxity did
not significantly alter the peak torque of flexors and of extensors and the hamstring/quadriceps ratio in this group. Cabrita et al.24 In a prospective study, we treated 68 infected hip arthroplasties with discharging sinuses and bone loss, comparing 30 patients treated in two stages without the use of a spacer (control group) and 38 patients treated with a vancomycin-loaded spacer (study group), concluding that the use of an antibiotic-loaded spacer in the 2-stage treatment of infected hip arthroplasties provides better infection control with good functional results and is superior to surgery in 2 stages without a spacer. Toledo et al.25 evaluated the influence of physical training with and without noninvasive ventilation at two levels of pressure in the airways (BiPAP®), in patients with chronic obstructive pulmonary disease. For both groups, there was a significant improvement in dyspnea and peripheral oxygen saturation at identical levels of physical exercise, in distance walked during the physical training, and in respiratory muscular strength (p<0.05). Only the physical training+B group had a significant improvement in heart rate, systolic blood pressure and oxygen consumption after training (p<0.05). Significant reductions of blood lactate were observed at identical levels of exercise in physical training+B when compared with isolated physical training (1.3±0.7 and 2.5±0.9mMol/L, p<0.05, respectively). They concluded that physical training associated with BiPAP® enhanced the oxidative muscular capacity, and could be an adjunctive resource of physical rehabilitation in patients with chronic obstructive pulmonary disease. Oliveira et al.26 investigated the biological behavior of classical and atypical osteoblastomas compared to osteosarcomas. The results validate atypical osteoblastoma as an entity, with p53 and proliferation cell nuclear antigen immunoexpression closer to that of osteosarcoma than of classical osteoblastoma. Proliferating cell nuclear antigen labeling index and p53 may be useful predictors of recurrence. Couto et al.27 evaluated the efficacy of chemonucleolysis in the treatment of lumbar disc herniation by means of a meta-analysis of 22 clinical trials. Chemonucleolysis with chymopapain was superior to placebo and was as effective as collagenase. Results for studies comparing chemonucleolysis with surgery were heterogeneous, making it difficult to interpret the summary measure of effect. Fonseca et al.28 Based on the patients’ data and on the index results, they conducted an analysis comparing the incidence of facial fractures under different conditions inside a car, taking into account the occupant’s position and seat belt use. The data indicate that the driver position shows a high incidence of facial fractures, not being effectively protected by the seat belt, although the wearing of seat belt seems to have a protective role against the occurrence of facial fractures in front-seat passengers. It was not possible to evaluate the wearing of seat belts among rear-seat passengers, even though the high incidence of fractures in this group showed its high susceptibility to the occurrence of facial fractures, which highlights the need to take protective measures against this situation. Albuquerque et al.29 conducted a study to test an intra-articular reconstruction of the anterior cruciate ligament of the knee in 10 human cadavers by replacing two anterior cruciate ligament bundles, with the purpose of producing a surrogate that would be structurally more similar to the anatomy of the anterior cruciate ligament and would provide the knee with more stability. The results obtained did not show superiority of double-bundle reconstruction over single-bundle reconstruction, and neither technique provided the knee with the same stability and rigidity of the intact anterior cruciate ligament. Furlaneto et al.30 evaluated the effect of delirium on mortality and on the evolution of cognitive and functional performance in elderly people with femoral fracture, four years after hospital discharge and concluded that delirium had no impact on mortality or functional and cognitive losses over the long term evolution among elderly patients with femoral fractures. The initial cognitive impairment may identify patients at risk for mortality, functional and cognitive losses over the long term evolution in elderly people with femoral fracture. The fragility and heterogeneity of our sample might have attenuated the predictive power of poor prognosis of delirium. Pectus excavatum (PEX) is a depression of the sternum in relation to the costal cartilages. Clinical and objective measures for classifying this defect are rare and difficult to apply. Rebeis et al.31 aimed to create an anthropometric index (AI) for PEX as a method for diagnosis and for preoperative and postoperative assessment by comparing it to the Haller index (HI) and to the lower vertebral index (LVI). The AI allowed adequate measurement of the defect, maintaining: a) a high correlation with the HI and the LVI and a high accuracy, similar to the already acknowledged and published indices and; b) an efficient comparison between the preoperative measurement and the postoperative results. Albuquerque et al.32 compared the accuracy of positioning of the femoral tunnel in reconstructing the anterior cruciate ligament by means of two techniques: tibial tunnel and anteromedial portal, and both techniques achieved the desired positioning for the femoral tunnel entrance and satisfactory thickness for the posterior cortex. Drilling via the anteromedial portal may provide greater protection against rupture of the posterior wall. Garbelotti Junior et al.33 suggested a low-cost and easily reproducible technique for biomechanical studies on cadavers. In this kind of study, the natural effect of loading of the joint and shear forces are not studied. The objective is to describe the plastic deformation of the ligaments into three-dimensional space. This technique was efficient for demonstrating the plastic deformability of the cruciate ligaments. The results proceeding from this type of study can assist in the planning of physical rehabilitation programs. Greve et al.34 evaluated the correlation between body mass index (BMI) and postural balance in unipodal support, and concluded that high BMI demands more displacements to maintain postural balance. Santos-Silva et al.35 determined the degree of reproducibility of maximum oxygen uptake (VO2max) among soccer players, using a modified Heck protocol. The modified Heck protocol was reproducible, and the 15-day interval between the ergoespirometric testing was insufficient to significantly modify the soccer players’ VO2max values.
Oliveira et al.\textsuperscript{36} evaluated the effects of pelvic floor muscle training during pregnancy, by means of perineometry with and without biofeedback and through the functional evaluation of the pelvic floor muscle, and to correlate the values of functional evaluation with perineometry. Pelvic floor muscle training resulted in a significant increase in pelvic floor muscle pressure and strength during pregnancy. A significant positive correlation between functional evaluation of the pelvic floor muscle and perineometry was observed during pregnancy.

Sakaki et al.\textsuperscript{37} compared the locked, unreamed intramedullary nail with Ender pins in the treatment of open Gustillo grade I or II or closed tibial diaphyseal fractures of type A, B or C2 of the AO classification, and concluded that both methods are similar in the treatment of type A, B and C2 tibial diaphyseal fractures.

Lucareli et al.\textsuperscript{38} evaluated the effect of clinically prescribed floor reaction ankle-foot orthosis on kinematic parameters of the hip, knee and ankle in the stance phase of the gait cycle, compared to barefoot walking on children with cerebral palsy. The results indicate that the parameters maximum knee extension and ankle dorsiflexion were significant in groups II and III while no change was observed in group I. The maximum hip extension was not significant in all three groups. When indicated to improve the extension of the knees and ankle in the stance of the CP patients’ floor reaction, ankle-foot orthosis was effective.

Macedo OG et al.\textsuperscript{39} Objective: This study compares skin folds in the dominant and nondominant hemibodies of a group (A) of 20 patients with Spastic Hemiplegic Cerebral Palsy, and a group (B) of 30 normal volunteers. Method: Body mass, height and skin folds were measured, and the percentage of body fat was estimated by prediction equations and by densitometry. The patients were grouped by disease and by age. The mean age in group (A) was 24.6 ± 5.6 years (ranging from 16.1 to 38.1 years) while the mean age in group (B) was 25.3 ± 3.8 years (ranging from 19.0 to 34.11 years). The incidence of gender was similar. Results: Statistically significant differences were observed in the data analysis for the biceps, triceps, thoracic, suprailiac, thigh and midcalf skin folds in group A; the biceps, subscapular, midaxillary, suprailiac, abdominal, thigh and midcalf skin folds in group B; and the percent fat obtained in the 3 equations in groups A and B when comparing the dominant and nondominant hemibodies. Only the triceps skin fold presented statistically significant difference in the dominant hemibodies when comparing groups A and B. In the analysis of the difference between the dominant and nondominant hemibodies of group A and of the difference between the dominant and nondominant hemibodies of group B, the biceps, triceps, thick and midcalf skin folds and the 3 equations presented significant statistical difference. The percent fat as estimated by densitometry presents significant statistical correlation with the 3 equations, in the dominant, nondominant hemibodies and in the mean value. Conclusion: There were statistically significant statistical differences between the skin folds in the dominant and nondominant hemibodies, both in group A and in group B (greater in group A). There was a statistically significant correlation between the percent fat as estimated by densitometry and that estimated by the 3 prediction equations in groups A and B.

Bispo Júnior RZ et al.\textsuperscript{40} The objective of this project was to study the mdm2 protein expression and to evaluate its relationship with some anatomopathological aspects, also aiming to identify prognostic factors, as regards local relapse-free survival (LRFS), metastasis-free survival (MFS) and overall survival (OS), in patients with primary liposarcoma of the extremities. Twenty-five among 50 patients admitted in the IOT / HC / FMUSP, in the period of 1968 and 2004, were chosen for the study. The adverse factors that influenced the risk of local relapse in the univariated analysis were: male gender (p=0.023), pleomorphic histological subtype (p=0.027) and high histological degree (p=0.007). In relation to MFS, age under 50 years (p=0.040), male gender (p=0.040), pleomorphic subtype (p<0.001), and high histological degree (p=0.003) had a worse prognosis. The adverse factors for OS were: age under 50 years (p=0.040), male gender (p=0.040), pleomorphic subtype (p<0.001) and high histological degree (p=0.003). There is no correlation between the expressions of mdm2 protein observed by immunohistochemistry and the anatomopathological variables studied. The immunohistochemical expression of the mdm2 protein was not considered of prognostic value in any of the survivals studied (LRFS, MFS or OS). The immunoeexpression of mdM2 protein proved a frequent event in the various subtypes of liposarcomas.

Dincel E et al.\textsuperscript{41} We aimed to discuss the risk assessments for both patients with hip fractures due to fall-related, low energy traumas and non-fractured control patients by examining bone mineral density and genetic data, two features associated with femoral strength and hip fracture risk. Twenty-one osteoporotic patients with proximal femur fractures and non-fractured, osteoporotic, age- and gender-matched controls were included in the study. Bone mineral density measurements were performed with a Lunar DXA. The COL1A1, ESR, VDR, IL-6 and OPG genes were amplified, and labeling of specific gene sequences was performed in a multiplex polymerase chain reaction using the osteo/check PCR kit from the whole blood of all subjects. The bone mineral density (trochanteric and total bone mineral density values) of the fracture group was significantly increased in relation to the control group. We were not able to conduct statistical tests for the polymorphisms of the COL1A1, ESR and VDR genes because our results were expressed in terms of frequency. Although they were not significant, we did examine differences in the IL-6 and OPG gene polymorphisms between the two groups. We concluded that increasing the number of cases will allow us to evaluate racial differences in femoral hip fracture risk by genotypes.

Lucareli PR, Greve JMD.\textsuperscript{42} There is still no consensus among different specialists on the subject of kinematic variation during the hemiparetic gait, including the main changes that take place during the gait cycle and whether the gait velocity changes the patterns of joint mobility. One of the most frequently discussed joints is the knee. This study aims to evaluate the variables found in the angular kinematics of the knee joint, and to describe the alterations found in the hemiparetic gait resulting from cerebrovascular injury. This study included 66 adult patients of both genders with a diagnosis of either right or left hemiparesis resulting from ischemic cerebrovascular injury. All the participants underwent
three-dimensional gait evaluation, and the angular kinematics of the knee joint were selected for analysis. The results were distributed into four groups formed with a basis on the median of the gait speed and the side of hemiparesis. The relevant clinical characteristics included the important mechanisms of loading response in the stance, knee hyperextension in single stance, and reduction of the peak flexion and movement amplitude of the knee in the swing phase. These mechanisms should be taken into account when choosing the best treatment. We believe that the findings presented here may aid in preventing the occurrence of the problems found, and also in identifying the origin of these problems.

REFERENCES


