The Validity of TOA Intraining Examination 1993 Knowledge in the Selected Papers from the Journals

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ABSTRACT

The Thai Orthopaedic Association (TOA) intraining examination in the year 1993 is an evaluation program. The quality of selected articles from the journals were evaluated by two assessors using the critical appraisal formed. Thirty seven articles from the various journals were selected in the examination. Only twenty (54 per sent) articles were evaluated by the assessors. Seven articles were considered as a valid and excellent studies. Thirteen articles (65 per sent) were the bad and poor study designs. All of them were the retrospective studies, heterogenous of interventions, unreliable of outcome measurements and inappropriate used of statistics.

The Thai Orthopaedic Association (TOA) Intraining Examination is not only an program evaluation but also an educational program. The standard text books, instructional course lectures and relevant journals are included in the examinations. The new knowledge usually comes from the recent journal, however, the published articles in the journals are not always valid and reliable[1-3]. Some of them had methodological flaws and used the inappropriate statistical techniques[1,4]. These new knowledge, therefore, should be selected critically by the trainers or examiners for the examinations. The purpose of this study is to evaluate the validity of the articles in the journals which were selected in the TOA intraining examination in the year 1993.

MATERIALS AND METHODS

Thirty seven articles from the various journals were included in the examination. Twenty articles were selected from the Journal Bone & Joint Surgery both American and British volumes. There were six articles of Journal Hand Surgery, each five articles from Spine and Clinical Orthopaedic and Related research (COR), one article from American Journal Sport Medicine. Four articles from the journal Bone & Joint Surgery, and one article in the COR were excluded because those were the literature reviews.

The evaluation criteria in this study were consisted with the appropriateness of the research design with the research question, population & sample, outcome measure, data collection and statistical analyses (Table 1). The evaluation method was done by the two independent assessors. The results of the evaluation will be classified in four levels of excellent, good, bad and poor. If there is an disagreement of the results, both assessors will discuss to get an only one result. Kappa statistic will be calulated the agreement of the assessors.

RESULTS

Only twenty articles (54 per sent) were evaluated by the assessors due to unavailable of some issues of the particular journals in the library. There were five studies of basic science and biomechanics, and one clinical research, which considered as the valid and excellent studies. Only one clinical research was evaluated as a good study. The bad and poor studies were included in thirteen articles (65 per sent). All of those articles were the retrospective studies, heterogeneous of the interventions, heterogenous groups of the patients, unreliable of clinical outcomes measured. Inappropriate used of statistical method were found in all the bad and poor articles. The agreement of two assessors was 84 per sent ($p<0.05$).

EXAMPLE

The Question No.177. The best treatment for congenital pseudarthrosis of tibia is...

a. intramedullary rod alone.
b. intramedullary rod with autogenous bone graft.
c. intramedullary rod with allograft.

Table 1 The critical appraisal formed for the published articles

1. Is the purpose of the study clearly stated?

2. What exactly is the study design?
   - If it is a controlled trail, is the allocation truly randomized?
   - If it is not a controlled trial, are there any biases in the allocation to the treatment?
   - If it is a retrospective study, are there any biases in the selection of the patient's records?

3. Who are the patients in the study?
   - Do the patients have the same prognostic factors? If they do not have the some, is the prognostic stratification used?
   - Are inclusion and exclusion criteria specified and replicable?
   - If there are two groups of the patient, is the baseline comparability of the two groups documented?

4. What, exactly, was the intervention performed?
   - Is it clearly defined? Is it the homogenous or heterogenous interventions?
   - Is compliance with the intervention(s) measured, and were noncompliers analyzed appropriately?
   - Are contamination and cointervention considered?
   - Are all patients who entered the study accounted for?

5. What outcomes were assessed in the study?
   - Are all clinically relevant outcomes reported?
   - Is the measurement of the outcomes valid and precise?
   - Is the measurement bias considered by the authors? how do the authors handle it?
   - If it is a retrospective study, did the previous routine record have the relevant data and how do the authors handly the missing data?

6. Are statistical test applied appropriately?
   - Do the authors consider the methods of analyses and the sample size requirement prior to the study?
   - When no statistically significant differences were found, did the authors consider the possibility of a type II error and estimate it probability?

7. Is the study valid and reliable?

d. intramedullary rod with autogenous bone graft mixed with allograft.

e. intramedullary rod with autogenous bone graft mixed with allograft and hydroxyapatite.

The question No.178. The most common deformity after congenital pseudarthrosis of the tibia treated by intramedullary fixation is...

a. varus deformity of the ankle.
b. valgus deformity of the ankle.
c. valgus deformity of the knee.
d. varus deformity of the knee.
e. equinus foot.

The reference of both questions was the article of Anderson DJ. et al: the Journal of Bone & Joint Surgery 74-A No.2,1992 p 161. This article was evaluated critically by using the evaluation formed as the following:

1. Is the purpose of the study clearly stated?
   No it is not.
2. What exactly is the study design?
   It is a ten years retrospective descriptive study.
3. Who are the patients in the study?
   There were ten cases of congenital pseudarthorosis of the tibia. The authors did not present that how many cases they did have in the study period, therefore, it can not tell that how the patients were selected.
4. What, exactly, was the intervention performed?
   The interventions are defined clearly, however, the intervention was not only IM nail and graft but also the hip spica, long leg cast, electrical stimulator, plate and screws. Some of the patients had unknown treatment of additional bone graft, and internal fixation. The patient compliance with cast and other kinds of intervention were not mentioned. Only eight patients were followed up. In summery the patients got heterogenous interventions.
5. What outcomes were assessed in the study?
   The clinical outcomes in this study were bony union, refracture, range of motion of the ankle joint, deformities after bony union. There is no, however, detail

of the data such as period of bony union, shortening, and rotational deformity. Moreover functional ability of walking was not mentioned.

The validity of the outcome measurement can not tell. Because the authors did not define clearly such as solid union and consolidation, do they have the some meanion? The biases of measurement can not be avoided. There was one missing data of ankle joint motion (case No.4).

6. Are statistical test applied appropriately?

The authors did not consider the statistical test. If we did it for them there were 5 cases of refracture of 50 per sent of treatment failure and forty per cent of rigid ankle.

7. Is the study valid and reliable?

This study is invalid because the results of treatment did not due to only the intramedullary nail but also the various type of other treatments (co-intervention). The clinical outcomes were not define clearly, therefore, the result was unreliable. This study can not demonstrate that wich one of the treatments is the best one for this condition due to the poor study design.

DISCUSSION

More than 2000 articles have been published in the journal per year[3]. The orthopaedist is confronted with an expanding volume of material to read. This information explosion offers more quality, but frequently less quality, for the reader[5] . The less quality of articles in the journal due to methodology was flawed, the data were incomplete, or the statistical methods were used inappropriately[1,5-7]. While the majority of medical investigators do not intentionally attempt to deceive, they are subject to influence by their biases or convictions. While the editorial review process should prevent very poorly conducted studies from being published, the system is not a perfect screen[4].

The evaluation method in this study was modified form the established criteria in the journal and text book[3,4]. The method of how to read and appraise the article in the journal is essential for not only orthopaedist but also the resident during training period. The fundamental of research methodology and statistics are the basic knowledge of all orthopaedic surgeons. These knowledge have been published in the journal Bone & Joint Surgery[2,7-12]. The ability to critically evaluate medical literature is becoming more important as an increasing number of articles describing innovations in field of orthopaedic are published. The critical appraisal skill can be improved by always practicing and using the systematic evaluation formed. Sixty-five percent of the twenty selected articles were considered bad and poor study design, these unscientific informations were used for the resident intraining examination. The error of selection the invalid articles to teach the resident is unacceptable, however, we hope that this error will eventually be minimized in the near future. Now the teaching process in medicine has been revised to the evidence based learning method. The teaching materials, therefore, should be prepared from the good and valid evidence support. We are the trainers or examiners, therefore, we should digest and appraise each article and material critically, and select only the valid ones for our othopaedic trainees and residents. This presentation is not intended to criticize anyone, except, the authors would like to improve our Thai orthopaedic's training program.

CONCLUSION

The examination is one of the medical education technique. The relevant and scientific knowledge should be selected to teach the trainees. There were 65 per sent of invalid informations in the TOA intraining examination in 1993. Theexaminers or trainer must be able to select the valid and reliable subjects from the various sources to teach the trainee in the orthopaedic surgery.

REFERENCES

1. Cowell RH. Editorial "Hard Decisions from Soft Data". J Bone Joint Surg(Am) 1990;72:1441.
2. Laupacis A, Rorabeck CH, Bourne BR, Feeny D, Tugweel P. Randomized trials in orthopaedics: Why, How, and When? J Bone Joint Surg(Am) 1989;71:535-48.
3. Troidl H, Spitzer WO, Mcpeek B. Principles and practice of research 2nd ed. New York: Springer-Verlag, 1991.
4. MorrisWR. A statistical study of paper in the jounal of bone and joint surgery 1984. J Bone Joint Surg(Br) 1988;70:242-246.
5. Cohen J. Editorial "Data Versus Meaningless Facts". J Bone Joint Surg(Am) 1991;73:959-960.
6. Cowell RH.: Editorial "Functions of the Editors" J Bone Joint Surg(Am) 1992;74:159-60.
7. Rineberg AB.: Editorial "A Call to Leadership" The role of orthopaedic surgeons in musculoskeletal outcome research. J Bone Joint Surg(Am) 1990;72:1439-40.
8. Santner TJ. Fundamental of statistic for orthopaedists. Part I. J Bone Joint Surg(Am) 1984;66:468-71.
9. Santner TJ, Burstein AH. Fundamental of statistic for orthopaedists. Part II. J Bone Joint Surg(Am) 1984;66:794-99.
10. Santner TJ. Fundamental of statistic for orthopaedists. Part III. J Bone Joint Surg(Am) 1987;66:463-70.
11. Santner TJ. Fundamental of statistic for orthopaedists. Part VI. J Bone Joint Surg(Am) 1984;66:1309-18.
12. Senghas ER.: Editorial "Statistics in The Jounal of Bone and Joint Surgery".Suggestions for authors. J Bone Joint Surg(Am) 1992;74:319-20.