http://dx.doi.org/10.2106/JBJS.21.00233


June 7, 2021

# *A reaction to the editorial "Meta-Analyses and Systematic Reviews: JBJS Policy Revisited."*

**Roderick M. Houwert**
Orthopedic traumasurgeon
University Medical Center Utrecht, Department of Trauma Surgery, Utrecht, the Netherlands.

**Other Contributors:**

**Bryan J.M. van de Wall**
Orthopedic traumasurgeon/clinical epidemiologist
Cantonal Hospital of Lucerne, Department of Orthopedic and Trauma Surgery, Lucerne, Switzerland ||
University of Lucerne, Department of Health Sciences and Medicine, Lucerne, Switzerland.

**Rolf H.H. Groenwold**
Clinical epidemiologist
Leiden University Medical Center, Department of Clinical Epidemiology, Leiden, The Netherlands.

**Moyo C. Kruyt**
Orthopedic surgeon
University Medical Center Utrecht, Department of Orthopedic Surgery, Utrecht, the Netherlands.

**NEXT study group NEXT study group: R. Babst, F.J.P. Beeres, J.N. Doornberg, R.H.H. Groenwold, M. van Heijl, M. Hogervorst, R.M. Houwert, F.F.A. IJpma, M.M.E. Knobe, M.C. Kruyt, L.P.H. Leenen, S.M. Muijs, F.C. Oner, B.J.M. van de Wall**

Dear editors,

We would like to comment on the revisited JBJS policy on meta-analyses and systematic reviews as captured in the editorial of the 103th issue.

First of all, we applaud the decision to increase the relevance and efficiency of systematic review projects by the principle that before undertaking such a project, similar review studies should be identified and only repeated if substantial new evidence can be expected. Also, the additional search in trial registries for unpublished data will be a great improvement as such data have the tendency to represent less favourable results. However, we have severe concerns about the new policy that meta-analyses and systematic

reviews should only include results of randomised controlled trials (RCTs).

Although RCTs are considered the highest level of evidence to establish the effects of medical treatments, many have pointed at the serious shortcomings of this design, especially for surgical research. These generally stem from the highly artificial conditions that have to be imposed on the surgical practice to fit into the design. As a consequence, the obtained results are often not representative or limited to a specific subgroup for a short time frame, thus limiting the applicability of trial results in daily practice. At the same time meta-epidemiological research has shown that non randomized observational studies of surgical interventions can be of high quality with low risk of bias too [1]. Therefore, it seems unwise to discard the results of non-randomized studies.

The strength of including observational studies in systematic reviews and meta-analyses is that all available evidence on a given topic is presented to the readers including the real-world variety of study populations and long-term outcome effects. In such reviews, data of RCTs and observational studies can be presented separately which allows readers to draw their own conclusions. On top of that, for each study, the quality can be appraised using available methodology (such as the MINORS criteria, the ROBINS-I tool, or the Cochrane Risk of Bias assessment tool), to provide readers with key information to appraise the validity of the included studies (RCTs and observational).

Our study group published several systematic reviews and meta-analyses including observational data for (orthopaedic) trauma [2-5]. These studies show the added value of including observational evidence: including more studies leads to larger sample sizes, which allows for more detailed investigation of subgroup effects. What is more, observational studies appear to be more representative of daily practice, e.g., in terms of patient and surgeon characteristics. Provided that the included observational studies are of sufficient quality, their results complement those of RCTs.

The most frequently named limitation in observational studies is the impossibility to correct for confounders such as surgical team, local preference and population characteristics. However, especially in orthopaedic trauma, which treatment a patient receives depends on which hospital he or she happens to visit, mimicking a random process. As a result, a comparison of ‘surgical schools’ is a recognized but seldom exploited natural experiment [6]. For example, ribfixation is incorporated in several hospitals in the Netherlands while other hospitals still favour non-operative treatment for patients with multiple rib fractures [7]. One could argue that this variation allows for an unprecedented natural experiment, that may be more valid than any RCT as inclusion of patients in such trials is subject to surgeons’ bias: “I am not including this patient, because she needs surgery”.

Our NEXT (Natural Experiment) study group aims to take advantage of such –undesired- high variability in surgeons' treatment preferences by comparing similar prospective cohorts with identical patient characteristics, with the sole difference: the local –biased- differing treatment protocols [8].

A recent review of the Canadian Orthopedic Trauma Society (COTS) showed that from developing an idea to publishing the RCT takes about 10 years [9]. From developing a research question to publishing the results of a study is a much faster process for observational studies. While RCTs are ongoing, patient care should be improved based on the full scope of available evidence, including observational studies.

Instead of making a distinction between randomised and non-randomised study designs, in our opinion the leading principle to include the results of a study in a systematic review or meta-analysis should be the quality of a study, including for example data quality, representativeness of daily practice (patients and surgeons), low attrition rates, and comparability of treatment groups. Different study designs should be regarded as complementary to each other when evaluating surgical interventions and initiatives to improve the design of observational studies should be welcomed. To enable the full potential of the existing literature both RCTs and observational studies should be included in systematic reviews and meta-analyses.

NEXT study group:

Prof. Dr. R Babst, University of Lucerne, Department of Health Sciences and Medicine, Lucerne, Switzerland.

PD. Dr. FJP Beeres, Cantonal Hospital of Lucerne, Department of Orthopedic and Trauma Surgery, Lucerne, Switzerland.

Prof. Dr. JN Doornberg, University Medical Center Groningen, Department of Orthopedic Surgery, Groningen, The Netherlands.

Prof. Dr. RHH Groenwold, Leiden University Medical Center, Department of Clinical Epidemiology, Leiden, The Netherlands.

Dr. M van Heijl, Diakonessenhuis Utrecht/Zeist/Doorn, Department of Surgery, Utrecht, The Netherlands || University Medical Center Utrecht, Department of Trauma Surgery, Utrecht, the Netherlands.

Drs. M Hogervorst, University Medical Center Groningen, Department of Trauma Surgery, Groningen,

the Netherlands.

Dr. RM Houwert, University Medical Center Utrecht, Department of Trauma Surgery, Utrecht, the Netherlands.

Dr. FFA IJpma, University Medical Center Groningen, Department of Trauma Surgery, Groningen, the Netherlands.

Prof. Dr. MME Knobe, Cantonal Hospital of Lucerne, Department of Orthopedic and Trauma Surgery, Lucerne, Switzerland.

Prof. Dr. MC Kruyt, University Medical Center Utrecht, Department of Orthopedic Surgery, Utrecht, the Netherlands.

Prof. Dr. LPH Leenen, University Medical Center Utrecht, Department of Trauma Surgery, Utrecht, the Netherlands

Dr. SM Muijs, University Medical Center Utrecht, Department of Orthopedic Surgery, Utrecht, the Netherlands.

Prof. Dr. FC Oner, University Medical Center Utrecht, Department of Orthopedic Surgery, Utrecht, the Netherlands.

Dr. BJM van de Wall, Cantonal Hospital of Lucerne, Department of Orthopedic and Trauma Surgery, Lucerne, Switzerland || University of Lucerne, Department of Health Sciences and Medicine, Lucerne, Switzerland.



## References

[1] Jacobs WC, Kruyt MC, Verbout AJ, Oner FC. Effect of methodological quality measures in spinal surgery research: a metaepidemiological study. Spine J. 2012 Apr;12(4):339-48.
[2] Ochen Y, Peek J, van der Velde D, Beeres FJP, van Heijl M, Groenwold RHH, Houwert RM, Heng M. Operative vs Nonoperative Treatment of Distal Radius Fractures in Adults: A Systematic Review and Meta-analysis. JAMA Netw Open. 2020 Apr 1;3(4):e203497.
[3] Ochen Y, Beks RB, van Heijl M, Hietbrink F, Leenen LPH, van der Velde D, Heng M, van der Meijden O, Groenwold RHH, Houwert

RM. Operative treatment versus nonoperative treatment of Achilles tendon ruptures: systematic review and meta-analysis. BMJ. 2019 Jan 7;364:k5120.
[4] Smeeing DPJ, van der Ven DJC, Hietbrink F, Timmers TK, van Heijl M, Kruyt MC, Groenwold RHH, van der Meijden OAJ, Houwert RM. Surgical Versus Nonsurgical Treatment for Midshaft Clavicle Fractures in Patients Aged 16 Years and Older: A Systematic Review, Meta-analysis, and Comparison of Randomized Controlled Trials and Observational Studies. Am J Sports Med. 2017 Jul;45(8):1937-1945.
[5] van de Wall BJM, Ochen Y, Beeres FJP, Babst R, Link BC, Heng M, van der Velde D, Knobe M, Groenwold RHH, Houwert MR. Conservative vs. operative treatment for humeral shaft fractures: a meta-analysis and systematic review of randomized clinical trials and observational studies. J Shoulder Elbow Surg. 2020 Jul;29(7):1493-1504
[6] Stadhouder A, Buskens E, de Klerk LW, Verhaar JA, Dhert WA, Verbout AJ, Vaccaro AR, Oner FC. Traumatic thoracic and lumbar spinal fractures: operative or nonoperative treatment: comparison of two treatment strategies by means of surgeon equipoise. Spine (Phila Pa 1976). 2008 Apr 20;33(9):1006-17
[7] Beks RB, Reetz D, de Jong MB, Groenwold RHH, Hietbrink F, Edwards MJR, Leenen LPH, Houwert RM, Frölke JPM. Rib fixation versus non-operative treatment for flail chest and multiple rib fractures after blunt thoracic trauma: a multicenter cohort study. Eur J Trauma Emerg Surg. 2019 Aug;45(4):655-663
[8] Beks RB, de Jong MB, Sweet A, Peek J, van Wageningen B, Tromp T, IJpma F, Wouters R, Lansink K, Bemelman M, van Baal M, Hoogendoorn J, Saltzherr T, Groenwold R, Leenen L, Houwert RM. Multicentre prospective cohort study of nonoperative versus operative treatment for flail chest and multiple rib fractures after blunt thoracic trauma: study protocol. BMJ Open. 2019 Aug 27;9(8):e023660.
[9] Axelrod D, Trask K, Buckley RE, Johal H. The Canadian Orthopaedic Trauma Society. Bone Joint J. 2021 May;103-B(5):898-901.

## Conflict of Interest: None Declared