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Protocol Article

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Development of a core outcome set for groin hernia trials: a study protocol

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ABSTRACT

INTRODUCTION. Reporting of outcomes in groin hernia trials is inconsistent and poorly defined thereby limiting the production of high-quality meta-analyses. Outcome reporting can be standardised and improved through consensus-based development of a core outcome set, which is a minimum set of outcomes recommended to be reported in all effectiveness trials within a specific field of research. We aim to develop a core outcome set for effectiveness trials within clinical groin hernia research.

METHODS. The study is divided into three phases. Phase 1 is an update of a systematic review on outcome reporting in groin hernia trials, which will identify relevant outcomes of groin hernia repair. In Phase 2, we will conduct multiple Delphi rounds to achieve consensus on which of the identified outcomes are most important. These Delphi rounds will involve important stakeholders in the field, i.e. patients, surgeons and researchers. In Phase 3, we will organise a consensus meeting to determine the final contents of the core outcome set. The meeting will involve the expert members of the study Steering Committee and invited key stakeholders. Data collection permissions and ethical approvals will be sought from the appropriate national and local authorities.

CONCLUSION. Development of a core outcome set for groin hernia trials is necessary and feasible.

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TRIAL REGISTRATION. COMET Database (registration no.: 1331) https://www.comet-initiative.org/Studies/Details/1331.

Groin hernia is a common condition that occurs due to a weakness of the abdominal wall in the groin region, and it is treated by surgical repair [1, 2]. Groin hernia repair is a frequently performed procedure, with approx. 800,000 annual repairs performed in the USA [3]. Many clinical trials investigating different surgical approaches and devices for groin hernia repair are being conducted. However, in many of these trials, the reporting of outcomes is flawed according to the recently published international guidelines for management of groin hernias [1]. Guidelines state that outcome reporting in groin hernia trials is heterogeneous and insufficiently defined, which is a serious impediment for accurate evidence synthesis through meta-analyses [1]; and it is particularly unfortunate as high-quality meta-analyses are integral to the development of evidence-based clinical guidelines.

The solution to this methodological problem is the development of a core outcome set (COS) for groin hernia trials. A COS is a consensus-based set of outcomes that should be assessed and reported as a minimum in all clinical trials within a specific area. COS rely on consensus between relevant stakeholders and is intended to streamline outcome reporting in trials, reduce outcome reporting bias and diminish research waste [4, 5]. A COS for groin hernia repair will standardise outcome reporting in groin hernia trials, promote high-quality meta-

analyses and strengthen the evidence base for clinical guidelines on groin hernia management.

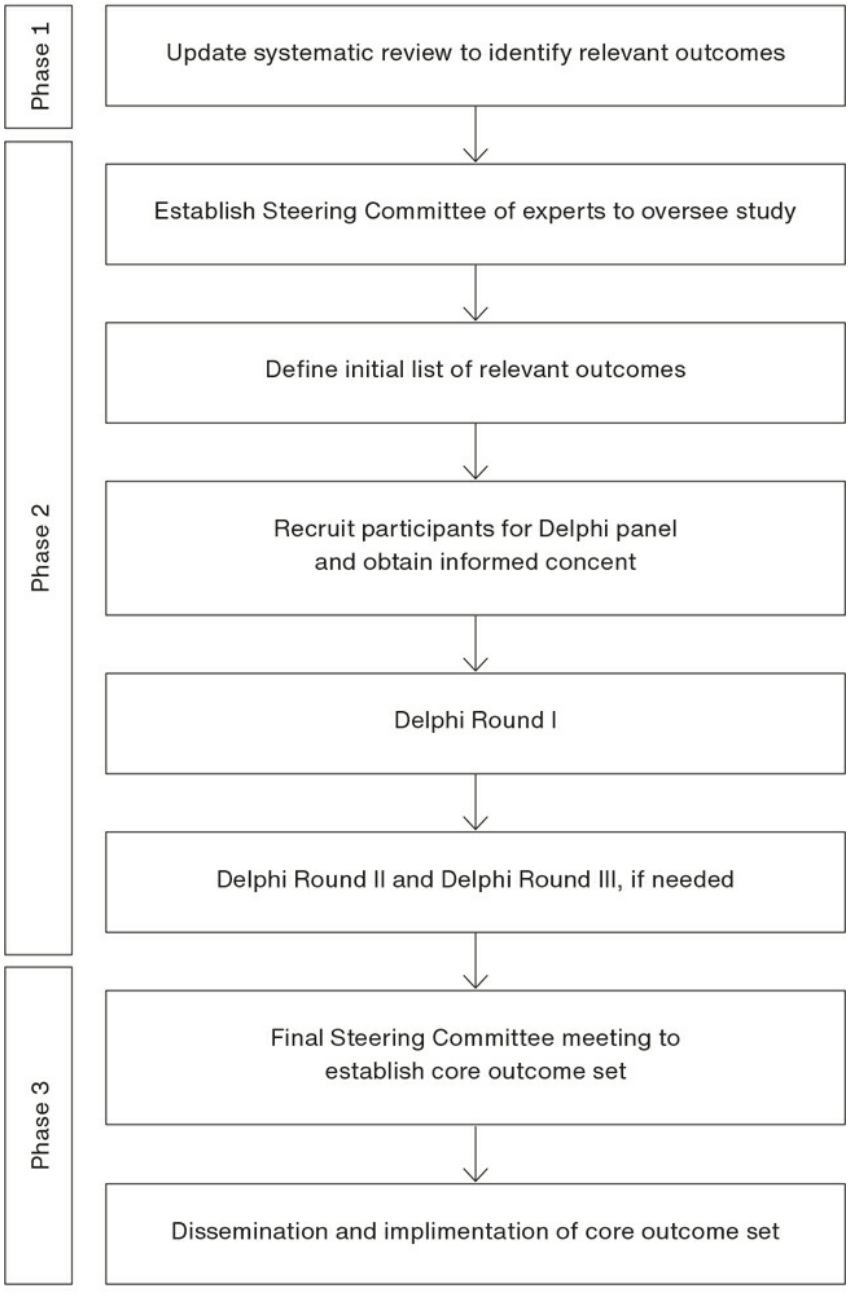
We aim to reach a consensus among key stakeholders on which outcomes of groin hernia repair are most important. These outcomes will be included in a COS, which will be recommended for use in all effectiveness trials comparing different surgical approaches or devices for groin hernia repair in adults.

METHODS

Reporting, registration and study design

This protocol is reported according to the Core Outcome Set-STAndardised Protocol Items (COS-STAP) statement [6]. The COS described in this protocol will be developed in accordance with the Core Outcome Set-STAndards for Development (COS-STAD) recommendations [7] and the Core Outcome Measures in Effectiveness Trials (COMET) Handbook [5]. A brief protocol for the present study has previously been registered in the COMET Database (registration no. 1331) [8]. The design of this study is outlined in **Figure 1** and is divided into three phases: Phase 1: Updating a previously published systematic review about outcome reporting in groin hernia trials. Phase 2: A Delphi study to reach consensus among stakeholders on which outcomes of groin hernia repair are most important. Phase 3: Consensus discussion in the Study Steering Committee and among key stakeholders to make a final selection of outcomes for the COS.

FIGURE 1 Study design: outline of the various stages in developing a core outcome set for groin hernia trials.



Phase 1: Updating systematic review on groin hernia outcomes

A systematic review published in 2015 assessed outcome reporting in groin hernia trials and meta-analyses [9]. A total of 40 randomised controlled trials (RCTs) and seven meta-analyses were included, and a total of 58 clinician-reported outcomes were identified. However, this review only included studies published between 2007 and 2011 and thus requires an update to identify any new unique outcomes from studies published after 2011.

The primary aim of this updated systematic review will be to identify new unique outcomes reported in RCTs and meta-analyses involving groin hernia repair in adults, which will serve as the starting point for the subsequent

Delphi process. This updated systematic review will be conducted and reported according to the PRISMA 2020 guideline [10], and a separate detailed protocol will be registered at PROSPERO. The included databases and registries will be Medline and PubMed Central via PubMed, EMBASE via Ovid, Cochrane CENTRAL and ClinicalTrials.gov. We will include all relevant types of outcomes (e.g. clinician-observed, patient-reported, etc.), and the identified outcomes will be mapped to broad outcome domains by a previously described method [11].

Phase 2: Delphi process

The aim of the Delphi process is to achieve consensus among stakeholders about the level of importance of the identified outcomes. The Delphi technique is the most popular method for COS development [5]. To oversee and provide advice for the Delphi study, we will establish a Study Steering Committee comprised of a panel of experts in the field. The Delphi rounds will be conducted through a secure online platform.

Information sources

Initially, we will formulate a list of all relevant outcomes of groin hernia repair. This will largely be based on outcomes identified in Phase 1, but may also include outcomes identified through other sources (e.g. qualitative studies). In addition, Delphi panelists will have the opportunity to propose new outcomes during the first Delphi round. All new outcomes proposed by panelists will be considered to allow for inclusion of potentially important novel outcomes not currently being reported in RCTs. The list of outcomes will be arranged according to the outcome domains defined in Phase 1. Outcomes may be excluded or combined with others if necessary, e.g., if the nature of an outcome is better reflected by other outcomes or if a substantial overlap exists between different outcomes. To ensure the comprehensibility of the outcomes list, it will be face-validated in small samples of the target populations. Ultimately, the decision on the final contents and composition of the outcomes list will be decided by the Steering Committee.

Stakeholders

To ensure the relevance, appropriateness and feasibility of the COS, it is imperative that the relevant stakeholders are represented in the Delphi panel. We will include both patients and surgeons/researchers in our Delphi panel, and the target stakeholder characteristics and the recruitment strategy are presented in **Table 1**. The panel will be divided into two groups: one for patients and one for surgeons/researchers.

TABLE 1 Target stakeholder characteristics and recruitment strategy.

	Patients	Surgeons/researchers
Qualifications	Patients who have received elective unilateral groin hernia repair May be primary or recurrent	Experienced surgeons who regularly perform groin hernia repair in adults, preferably with a high annual volume, with documented experience in conducting groin hernia trials and preferably postdoctoral level or higher
Age	18-70 yrs	Any
Gender	Any	Any
Exclusion criteria	Autoimmune, endocrine, psychiatric or malignant comorbidity, or physical/ mental inability to participate Insufficient knowledge of English	Relevant conflicts of interest Insufficient knowledge of English
Recruitment strategy	Will be recruited either prospectively by project personnel or retrospectively by the treating surgeon	Will be recruited through purposive sampling to ensure appropriate geographical and cultural representation

Currently, no recommendations exist regarding the necessary sample size for COS development studies [5]. Populations in previous studies have varied considerably, ranging from around ten participants to several hundred [5]. In the present study, we will take a pragmatic approach using purposive sampling, and all participants identified through our recruitment strategies will be included (Table 1). The primary consideration in the recruitment phase will be to achieve a satisfactory representation of key stakeholders, and the composition of the Delphi panel will ultimately be judged by the Steering Committee.

Delphi Round I

The included participants will receive a tailored Delphi questionnaire, including basic information about context, methodology and aim of the study, questions about participant characteristics and a list of outcomes.

Participants will be asked to rate each listed outcome by its perceived importance, using a nine-point Likert scale. Ratings 1-3 indicate limited importance, 4-6 indicate important but not critical and 7-9 indicate that an outcome is critical [5]. Here, participants will also have the opportunity to suggest new outcomes for inclusion if they feel that an important outcome is not covered by the already listed outcomes. Participants will receive regular e-mail reminders during each round.

Round I data will be analysed with descriptive statistics, both separately for each stakeholder group and overall. Results will be evaluated according to the consensus definitions listed in **Table 2**. If an outcome does not meet the consensus criteria, it will be labelled “no consensus”. At the end of Delphi Round I, we will conduct a steering committee meeting to evaluate the results and discuss the additional outcomes proposed by participants. The Steering Committee will decide the contents of the questionnaire for Round II.

TABLE 2 Consensus definitions.

Consensus	Definition[a]
In[b]	≥ 90% of participants in 1 stakeholder group rating an outcome 7-9: "critical" *Or* ≥ 70% of participants in both stakeholder groups rating an outcome 7-9: "critical" And < 15% of participants in both stakeholder groups rating an outcome 1-3: "limited importance"
Out[c]	≤ 50% of participants in both stakeholder groups rating an outcome 7-9: "critical"

a) Definitions are adapted from [5, 12-14].
b) Outcomes to be included in the core outcome set.
c) Outcomes to be excluded from the core outcome set.

Delphi Rounds II and III

Participants completing Round I will be re-invited for Round II. They will be presented with feedback from Round I and a new questionnaire. Participants will be asked to consider the feedback before rating the remaining outcomes in the same manner as in Round I. Outcomes upon which a consensus was achieved in Round I will not be rated again in Round II, but participants will be informed about the obtained consensus. If participants choose to change their response from Round I, they will be required to justify this choice through additional items added to their questionnaire. The feedback from each stakeholder group as well as the overall feedback will be presented to all participants [12]. Feedback will be presented using descriptive statistics and histograms.

At the end of Delphi Round II, the Steering Committee will convene again to evaluate the results and discuss the need for a third Delphi round. If a consensus is reached after Round II, we will proceed to Phase 3 of the study. If no consensus is reached after Round II, a third Delphi round will be conducted before proceeding to Phase 3. The third Delphi round (if needed) will follow the procedure applied in Round II. The interquartile range (IQR) for the ratings of each outcome will be applied as a metric of variability among participants' opinions ("degree of agreement"). A reduction in IQR for each outcome between adjacent rounds will be considered an indication of increasing consensus, and this will be considered when determining the need for an additional Delphi round, as described previously [5].

Phase 3: Consensus meeting and dissemination

The aim of Phase 3 is to select a pragmatic and feasible set of core outcomes for inclusion in the COS based on the results from Phase 2. Key stakeholders who completed all Delphi rounds will be invited to participate in Phase 3, and they will join the Steering Committee for a final consensus meeting. This meeting will be conducted either face-to-face or by video conferencing and will be facilitated by one or more facilitators. The results from Phase 2 will be presented and discussed. We will examine differences between the two stakeholder groups; differences across nationalities, genders and age groups; and the degree of agreement for each outcome will be studied. The contents of the COS will be discussed until a consensus is reached. The findings of this study will be reported through publication in a peer-reviewed scientific journal, through conference presentations and through the COMET Initiative.

ETHICAL CONSIDERATIONS AND DATA SECURITY

Informed consent and a declaration of relevant conflicts of interest will be obtained from all participants before

data collection. Approvals from the appropriate data security authorities will be sought. All data will be collected through a secure digital platform in compliance with all applicable data security and privacy laws, including the General Data Protection Regulation (GDPR). The stored data will be anonymised, encrypted and handled confidentially. Permission from the appropriate medical ethics committees will be applied for as necessary. The study was cleared by the Medical Ethics Committee of the Capital Region of Denmark (registration no.: H-21041300).

Trial registration: COMET Database (registration no.: 1331) https://www.comet-initiative.org/Studies/Details/1331.

DISCUSSION

With this study, we aim to unify and streamline outcome reporting in groin hernia trials and facilitate better meta-analyses to support clinical guidelines, which is in line with current international guidelines on groin hernia management [1]. The development of COS is also in line with the sentiment of various high-impact journals, which increasingly recognise the value of COS. Some journals are even demanding the use of a COS in RCTs if available [12]. Parallel to the present study, a COS for incisional hernia surgery is under development [11, 16]. Some similarities between the two are expected. However, incisional and groin hernias are two distinctly different conditions with different symptoms and outcomes, and two separately developed COS are therefore necessary.

Limitations

We will seek to minimise attrition in the Delphi phase by sending personalised e-mail reminders to participants, but the study may still be susceptible to attrition bias. If participants realise that they are of the minority opinion based on the feedback presented to them from a previous Delphi round, they may have an increased risk of attrition. This induces a risk of overestimating the degree of agreement between stakeholders and, hence, a risk of attrition bias [5]. To investigate any bias caused by attrition between Delphi rounds, we will compare ratings given by dropouts and completers in previous rounds and evaluate if differential attrition occurs. Timing of outcome assessment, e.g., if evaluation at long- or short-term follow-up of each outcome is preferable, will not be considered in the present study but may be included in a potential later adaptation or expansion of this COS.

CONCLUSION

The COS development described in this protocol will identify which outcomes should be recommended to be reported in clinical effectiveness trials comparing different surgical approaches or devices for groin hernia repair in adults. This is warranted due to the current heterogeneity in outcome reporting in clinical trials, as specified in current international guidelines for management of groin hernias.

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Conflicts of interest Potential conflicts of interest have been declared. Disclosure forms provided by the authors are available with the article at ugeskriftet.dk/dmj

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