

Ulla Krause* and Katrin Jung

Geriatric Fracture Centre (German Trauma Society): guidelines and certification to improve geriatric trauma care

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Abstract: Because of demographic changes and the increasing proportion of orthogeriatric patients, the German Trauma Society (DGU) established a certification process for geriatric fracture centres (AltersTraumaZentrum DGU®). This article is a detailed illustration of the certification process and the related Registry. The main goal of the certification is to support orthogeriatric comanagement and to improve the quality of care for geriatric patients. The requirements of the Criteria Catalogue force participating centres to continuously survey and improve their standards and structures. As a result, the requirements should lead to a high quality of care. To prove that the certification leads to higher quality of care, the DGU started a Geriatric Fracture Registry (AltersTraumaRegister DGU®) in 2016, which is obligatory for all certified centres. Studies on comanaged care and the improvement of quality by certified geriatric fracture centres are planned. Further health-care research will also be possible with the collected data.

Keywords: certification; geriatric fracture centres; geriatric fracture registry; Geriatric Trauma Center; geriatrics; orthogeriatric comanagement; trauma surgery.

Introduction

Geriatric trauma care will become more important in the coming years. Due to demographic changes and medical advances, the proportion of the elderly in the population will continuously increase. As a result, orthopaedic and trauma surgeons will face more geriatric patients.

*Corresponding author: Ulla Krause, Akademie der Unfallchirurgie (AUC), Wilhelm-Hale-Straße 46b, 80639 München, Germany, E-mail: atz@auc-online.de

Katrin Jung: Akademie der Unfallchirurgie (AUC), München, Germany

The German Society for Geriatrics [Deutsche Gesellschaft für Geriatrie (DGG)] defines a geriatric patient as an elderly patient (above 70 years old) with age-related multimorbidities or as a patient above 80 years old with age-specific increased vulnerability, higher risk of chronification, and also higher risk of loss of autonomy [1]. Already today, with regard to patients ages 70 years and older, a fracture of the coxal femur (ICD 10: S72) is among the top three diagnoses for hospitalisation, with three-quarters being female patients [2]. This diagnosis is a surrogate marker for impaired general condition [3] and the patients have special needs regarding, for example, comorbidities or medication. In 2008, a German study showed that most trauma units do not have defined processes and structures for osteoporotic fractures [4]. To treat geriatric patients in the best possible way, not only orthopaedic and trauma knowledge is crucial but also the geriatrician's skills are required. Recent research showed the benefits of a comanagement approach of care [5, 6]. Therefore, the German Trauma Society [Deutsche Gesellschaft für Unfallchirurgie (DGU)] established a certification for orthogeriatric centres called "AltersTraumaZentrum DGU®", which supports comanagement between trauma surgeons and geriatricians. Upon passing an independent audit process, hospitals can receive the certification as AltersTraumaZentrum DGU®. Certified centres are obliged to participate in the Geriatric Fracture Registry (AltersTraumaRegister DGU®), which includes an internationally accepted data set.

At the moment, the number of certifications in the medical context is rapidly rising in Germany, and "Zertifizitis" (meaning an "epidemic of certifications") is already being spoken about. Finally, hospitals need to see the advantage of participating in a certification process (e.g. better quality of care, quality surcharges, marketing effects, and possibilities for better networking). The criteria for a "good certification" and the question of whether AltersTraumaZentrum DGU® has an added value for certified hospitals will be discussed later in the article.

AltersTraumaZentrum DGU®

With the AltersTraumaZentrum DGU® certification, which was established in 2014, the DGU wishes to improve the trauma care of elderly patients. Most of these patients should be treated not only by trauma surgeons but also by geriatricians. Therefore, the main goal of AltersTraumaZentrum DGU® is to make sure all the needs of geriatric patients are covered, for example, concerning their comorbidities, higher risk of complications, or delirium. Studies on orthogeriatric care found indications for the advantage of the comanagement of care compared to “normal care” without geriatric expertise [5–10]. Although there is no significance so far, there are indications that comanaged care leads to lower rates of complications, mortality, and readmission as well as to shorter times to surgery and shorter lengths of stay or even to improved mobility after 4 months. At present, the DGU certification cannot be compared to other initiatives or studies due to a lack of data. In the future, a comparison will be possible because of the obligatory data entry in the related Registry (AltersTraumaRegister DGU®).

Before the official start of AltersTraumaZentrum DGU®, the whole certification process was evaluated in a pilot phase in 2012 and 2013, with 10 participating orthogeriatric centres in Germany. The results of the evaluation were used to optimise the process as well as to check the criteria that had to be fulfilled by the orthogeriatric centres. After this pilot phase, the certification of AltersTraumaZentrum DGU® started in 2014 and has proven to be a success story. Currently, nearly 50 centres in Germany and Switzerland are certified and more than 150 centres are already registered (Figure 1).

Certification attests to the meeting of criteria for interdisciplinary teams of trauma surgeons and geriatricians and aims to optimise the comanagement and to improve the quality and safety of care. As a result, elderly patients

receive individually adjusted care and structured medical rehabilitation. The DGU wishes to avoid problems and to optimise the recovery process of geriatric patients. Patients should regain their mobility as soon as possible to maintain their independence to the fullest possible extent. The prevention of a fall and the recovery of the extent of mobility and independence they had before the injury are important for the quality of life, especially for geriatric patients. As a result of the certification and the related quality of care, AltersTraumaZentrum DGU® wishes to improve the prognosis of geriatric patients after a fall.

The certification process of AltersTraumaZentrum DGU® is managed and administrated by the Academy of Trauma Surgery [Akademie der Unfallchirurgie (AUC)]. Centres must register to start the whole process. After signing a contract determining all the responsibilities and duties and paying the certification fee, a checklist must be filled out and handed in. The list will be checked by an independent certification company. The company is responsible for the expert assessment of the centres. It will arrange a date for the audit, when two auditors will visit the centre and all associated units. One auditor is responsible for the system audit and will review the quality management structures. The second auditor is a trained professional expert (e.g. a chief physician or a senior trauma surgeon or geriatrician with management experience in an orthogeriatric centre). After the 7-h visit, the auditors write a summary and reach a decision as to whether or not the criteria for certification as AltersTraumaZentrum DGU® are met. If the audit is successful, the centre will receive the certificate. In the case of some minor criteria not being met, the centre is required, for example, to submit certain revised documents within a given time to obtain certification. If it is insufficient merely to evaluate revised documents (e.g. the centre is required to reimplement certain structural measures), a second but shorter

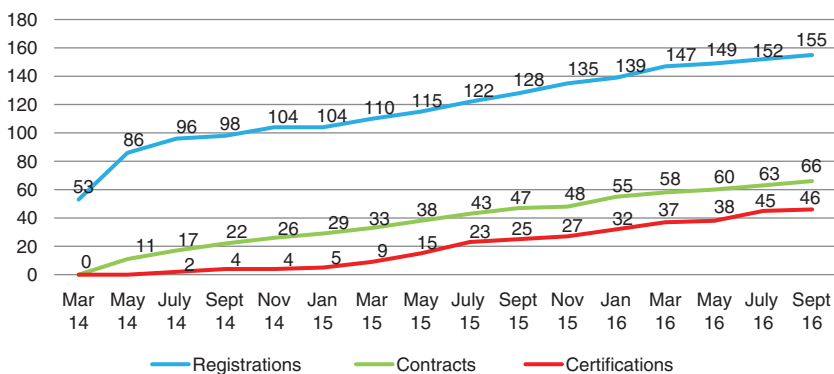


Figure 1: Development of geriatric fracture centres (AltersTraumaZentrum DGU®) since the starting point.

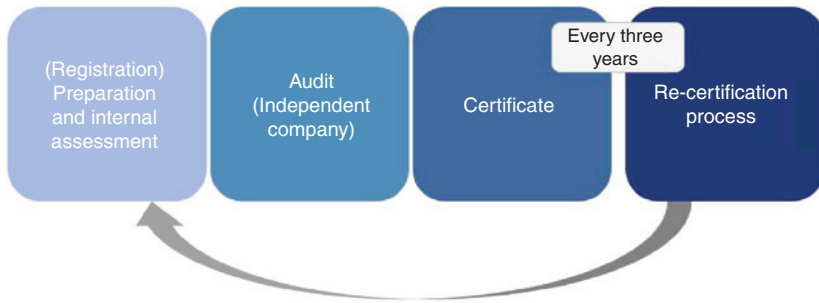


Figure 2: How to become a certified centre.

audit will be planned, when the professional expert will again check the fulfilment of the criteria on-site during a postaudit within 6 months of the original audit.

A certification is valid for 3 years. After this period, the centre may initiate a reaudit process to regain the certification (Figure 2).

Criteria and guidelines of AltersTraumaZentrum DGU®

It is obvious that, when mentioning quality, this often concerns the mention of standards and algorithms. To ensure that a certification does not just look good on paper but also has a practical impact, standards must be high enough to ensure a high quality of care but not too high for implementation in clinical structures. Hospitals applying for AltersTraumaZentrum DGU® must fulfil structural standards as well as standards for education, communication, and documentation. These standards are stated in the Criteria Catalogue [11]. It was developed by the geriatric trauma working party, a subgroup of the DGU (AG Alterstraumatologie der DGU), involving the Federal Association of Geriatrics (Bundesverband Geriatrie) and the DGG, and is based on a wide professional consensus [11]. Both the quality of care and the outcome should be (im)proved by the centres by meeting the given criteria of process quality and structural standards.

The Criteria Catalogue is divided into five chapters: (I) Structures, (II) Trauma Surgery, (III) Geriatric Care, (IV) Interdisciplinary Cooperation, and (V) Quality and Risk Management.

In Chapter I (Structures), the framework of a centre is set out: At least two units are necessary to build up an orthogeriatric centre: one trauma unit with inpatient beds and one geriatric unit. The geriatric unit may have different structures: e.g. units with inpatient beds or

rehabilitation centres are both possible. The units do not necessarily have to belong to the same hospital. Collaboration between different hospitals or a trauma unit and a rehabilitation centre for geriatric patients is also possible. At present, limited geriatric personnel resources necessitate the variability and flexibility of collaborative forms to cover the needs of geriatric expertise for elderly trauma patients. To date, there is no evidence of the advantage of one or another of the collaborative forms. Practical experience leads to the conclusion that the implementation level of interdisciplinary cooperation and the related advantages for patients must be assessed regardless of the form of collaboration between trauma surgeons and geriatricians [3]. All units involved in the AltersTraumaZentrum DGU® will be assessed during the certification process and the basic idea of a common orthogeriatric centre must be clearly recognisable. That is why the units of one centre must have, for example, common guidelines and standard procedures of care and regularly hold communal meetings. A Steering Board must be established, consisting of at least one leading member of each of the participating units. The Committee is responsible for the common rules of procedure, which must comprise the following subjects: competence and responsibilities of the Steering Board, collaboration of the Board members “at eye level”, commitment to continuous quality improvement including interdisciplinary training courses for employees, representing the centres, and supporting the idea of the centres (e.g. by communal training courses and meetings).

To effectively and successfully operate as an AltersTraumaZentrum DGU®, not only trauma surgeons and geriatricians but also radiologists and anaesthesiologists are needed. In addition, other clinical departments must be included in the process of the care of orthogeriatric patients. For this reason, standard operating procedures (SOP) must be stated in writing for the following topics: Emergency Department, Physical Therapy, Ergotherapy,

Supply of Medical Aids, and Discharge Management. The main focus of all SOP must be on orthogeriatric care.

The second chapter of the Criteria Catalogue concerns the Trauma Surgery Unit. The Head of the unit must be an orthopaedist and trauma surgeon with qualifications as a specialised trauma surgeon, with the educational authorisation for these subjects. To apply as AltersTraumaZentrum DGU®, SOP for at least the indications of femorocoxal fractures, proximal humeral fractures, body of vertebral fractures, hip fractures, and periprosthetic fractures must be submitted, naturally also with a focus on orthogeriatric care. The trauma care is obliged to fulfil the criteria of evidence-based medicine and must regard the guidelines of medical societies.

The criteria for geriatric care are to be found in Chapter III of the Criteria Catalogue. The Head of the unit must be an approved geriatrician (specialist in geriatrics or with a focus on geriatrics or a further specialisation in geriatrics), with the educational authorisation for geriatric care. Naturally, geriatricians must regard the principles of evidence-based medicine and also the guidelines of the medical societies. The priority of the integration of rehabilitative aspects in orthogeriatric care at the earliest possible stage must be set out. If possible and if there is the indication for it, complex geriatric treatment should be implemented. The processes of geriatric care must also be stated in writing in a SOP. A list of all SOP required for the certification can be found on <http://www.alterstraumazentrum-dgu.de> (only available in German).

Chapter IV is the centrepiece of the Criteria Catalogue. It contains the requirements for the main goal of the certification, the improvement of interdisciplinary cooperation and comanagement. Collaboration between trauma surgeons and geriatricians must be guaranteed by involving competent personnel from both units. Geriatric patients should be identified by using the appropriate screening. The screening should be done on the day of admission but not later than 1 day after surgery. To treat elderly patients in the best possible way, it is necessary for geriatricians – or trauma surgeons and vice versa – to be available in the other unit at short notice when needed. In addition, at least twice weekly, a geriatrician must be present in the Trauma Unit or a trauma surgeon must see the patients in the Geriatric Unit. As mentioned before, the treatment involving radiologists, anaesthesiologists, and other medical professionals must be defined in an SOP. The procedures and treatments for patients who are not fit enough for surgery are especially very important.

Orthogeriatric centres place the focus on interdisciplinarity and have special competence in detecting and recognising complications and risks. Collaborating

specialists can identify the needs and problems of geriatric patients, including pain, delirium, prevention of fall, osteoporosis, decubitus ulcers, and nutrition, already at a very early stage. Interdisciplinary cooperation is not limited to cooperation between trauma surgeons and geriatricians. Physiotherapists or ergotherapists must also be included. The commitment of all these specialists is important for the outcome of care. In particular, to ensure a better prognosis for an independent life, patients should be mobilised as soon as possible after surgery. Pain therapy concepts are needed, taking into account age, comorbidities, indication, and the actual health status. If all the specialists work together, the quality of life of orthogeriatric patients can be improved. For this reason, all SOP must be set out with clear and agreed procedures and high-quality standards. The responsibilities of certified centres do not end with the discharge of the patient. The outcome can also be improved with good and organised discharge management.

For a high quality of comanagement, the minimum of once-weekly interdisciplinary meetings should be held for discussion of treatments, organisation of the care, and needs of rehabilitation of orthogeriatric patients. Participants should be at least one trauma surgeon, one geriatrician, as well as representatives of the nursing staff, physiotherapy, and hospital social services.

The criteria for standards and algorithms of care for both units and for interdisciplinary cooperation are important.

Another important factor for centres is Quality and Risk Management (Chapter V). Centres are obliged to have a Quality Management System and to provide performance indicators for the quality of structures and processes as well as for outcome parameters. In addition, centres must prove that they fulfil the requirements of the Criteria Catalogue and in particular the requirements for interdisciplinarity. A specific Quality Management System is also mandatory, including measures for risk management (e.g. prevention of patients' confusion and prevention of MRSA and other hospital pathogens) (Table 1).

Registry

To answer important questions in the fields of health-care and orthogeriatric research and to ensure a high quality of care in certified centres, valid data are required. AUC and DGU have already gained long-standing experience with registries by establishing and managing the TraumaRegister DGU®, a registry for the documentation

Table 1: Standards for certifications and how they are represented.

Standards and algorithms	Criteria Catalogue (examples)
Structural standards	Steering board
Educational standards	Educational authorisation for trauma surgery and geriatric care
Standardised surgical care algorithms	SOP for femorocoxal fractures
Standardised geriatric care algorithms	SOP for delirium and nutrition
Standardised interdisciplinary care algorithms	SOP for patients unfit for surgery
Documentation standards	Trauma Registry (AltersTraumaRegister DGU®)
Communication standards	Team meetings

of severely injured patients. Certified orthogeriatric centres are obliged to participate in the newly established Geriatric Fracture Registry (AltersTraumaRegister DGU®), which is managed by the AUC. The Registry is based on an internationally accepted data set and has been open for documentation since January 2016. Before the official start, a pilot phase was concluded and some minor adjustments were made to the data set [12]. The collected Registry data are usable for comparison to the Fracture Fragility Network (FFN) Database in the United Kingdom and the Australian and New Zealand Hip Fracture Registry. The main goals of the Registry are quality assurance and health-care research. In addition, performance should be improved and the outcome for orthogeriatric patients should be maximised. A better outcome corresponds to reduced mortality and reduced rates of readmission to centres. Certified centres gain a benchmark, ensure permanent improvement in quality, and are allowed to use Registry data for research. They receive an Annual Report that compares the data of their own centre to the accumulated data of all participating centres.

To ensure a high quality of data, patient files are controlled on a random basis during the reaudit of the centres to regain certification as an AltersTraumaZentrum DGU®. Before data acquisition, a Declaration of Consent must be signed by the patient. In accordance with German data protection laws, the AUC has taken appropriate technical and organisational measures against unauthorised or

unlawful access and against accidental loss, destruction, or data corruption.

The Registry focuses on trauma care with some questions especially regarding comanagement. All patients admitted to an orthogeriatric centre who are ages 70 years or older and are suffering from a femorocoxal fracture are to be reported to the Registry.

The Registry consists of eight different chapters, six of which are mandatory (Table 2).

The first chapter concerns the admission of the patient, with general information about age and sex as well as geriatric screening, prefracture mobility, prefracture residence, and prefracture bone protection medication. These items give an overview of the independence of the patient and allow conclusions about the health status before being admitted to the centre.

The following chapters cover presurgery, surgery, and the first week postsurgery. ASA classification, type of fracture, date and time of surgery, type of anaesthesia, surgery performed, and mobilisation on day 7 postsurgery must be reported. To monitor if orthogeriatric comanagement is performed at an early stage, a question about the first contact between the geriatrician and the patient is included in the Registry. In addition, enquiries are made concerning the discharge destination after the Trauma Unit, for example, to acute geriatric care, rehabilitation, or home. To monitor the outcome of care, a further standardised instrument, the EQ-5D Questionnaire, must be filled out 7 days postsurgery and again 120 days postsurgery.

Table 2: Overview of the registry.

Chapter	Parameters (examples)
Patient admission	Age, sex, geriatric screening, prefracture mobility
Presurgery	ASA classification, type of fracture
Surgery	Date and time of surgery, type of anaesthesia
Day 7 postsurgery	Mobilisation, date and time of first contact between geriatrician and patient
Follow-up day 7 postsurgery	EQ-5D Questionnaire
Patient discharge	Destination
Follow-up	Postfracture mobility, readmission
Follow-up 120 days postsurgery	EQ-5D Questionnaire

These follow-up items provide much useful information about the quality of care [13, 14].

Unfortunately, data protection laws in Germany, structures and practicability problems within the hospitals, and the lack of time of the clinical staff responsible for data entry decrease the number of answers and thus the significance.

Within the following years, the collected Registry data will provide a larger data set for scientific analysis. Despite quality assurance, research will be done (e.g. regarding outcome and comanagement parameters) and will provide reliable data for the development of guidelines.

Certification in the medical context

In the medical context, the “AltersTraumaZentrum DGU®” certification is only one among many certifications in Germany. Although there are a large number of different certifications, to date, there are no official criteria for “good” certifications. The central criticisms are that normative requirements are not always based on a wide professional and/or scientific consensus, the meaning and the added value of the certificates are not clear enough, and the impartiality and independence of the certification companies are questionable. In 2009, the German Medical Association (Bundesärztekammer) already started criticising the increasing number of certifications and centres with (especially for patients) unclear meaning [15]. In 2011, they established a working group on criteria for certifications and adopted the recommendations of the Swiss Academy of Medical Sciences (SAMS) for certifications in the medical context [16]. Key recommendations of the SAMS are, for example, an added value attested by the certification, an accredited and qualified certification company, publicly available normative requirements for the certification, an audit process, and an expiry date of the certificate [17]. In 2015, a new Institute for Quality Assurance and Transparency in Healthcare [Institut für Qualitätssicherung und Transparenz im Gesundheitswesen (IQTiG)] was established in Germany. Its goal is to develop criteria for the evaluation of certifications, common inpatient and outpatient care, and information about the validity of these certifications in a generally intelligible way. The AltersTraumaZentrum DGU® certification fulfils all key recommendations of the SAMS and is well prepared for the forthcoming evaluation of IQTiG.

Despite the development of criteria for certifications, undoubtedly certifications are neither an end unto themselves nor a guarantee of high quality. Accordingly, there

is no evidence that in general certificates necessarily ensure better outcome.

Hospitals applying for certification as an orthogeriatric centre only for marketing reasons will not be motivated enough to transform the requirements into reality and, as a result, there will most likely be no quality improvements. Instead of just claiming that the quality has been increased, to make sure of this fact, certifications should prove that all the requirements for a quantifiable improvement of quality have been fulfilled, for example, a Quality Management System is established and standards for structures, procedures, and outcome are defined. The criteria and requirements of a certification define whether a high likelihood of quality improvement is or is not evident by passing or not passing the procedure. In any case, a certification is only useful if it has an expected internal or external added value.

Together with the accepted Criteria Catalogue, the required high standards, and the AltersTraumaZentrum DGU® Orthogeriatric Registry, the hospitals and units committed to orthogeriatric care are addressed and participating centres are forced to constantly improve their quality of care and outcome.

Discussion

The AltersTraumaZentrum DGU® certification is the most widespread certification for orthogeriatric centres in Germany. After nearly 2 years of experience with the certification process and almost 1 year of experience with the Registry, the whole process is well established and accepted by hospitals. The first Registry data will be analysed within the next year. In interpreting the data, one should keep in mind that the selection of patients could have occurred. A certification could lead to the preferred admission of patients in poor health to specialised centres by emergency services. Research regarding the benefits of comanaged orthogeriatric care has to be carried out to compare certified orthogeriatric centres to hospitals that offer “normal” care without comanagement. One of the most important factors when considering the estimated benefits of certification and comanagement for geriatric patients is the preservation of mobility and independence. Outcome parameters are included in the Registry but at the moment do not have to be mandatorily documented. The DGU and the Geriatric Trauma Working Group (AG Alterstraumatologie) are already discussing study designs and possibilities for the support of follow-up studies.

A first study using the data of the pilot phase shows the high multimorbidity of geriatric patients and the need

for high process quality in the centres (e.g. regarding medication). First results indicate that comanagement of care in the certified centres leads to an improvement in the time to surgery and osteoporosis therapy [13].

Within the following years, the whole certification process will be evaluated regarding structures and criteria. The collected data in the Registry will be used, for example, for analysing the different structures of the certified centres regarding a best-practice model.

Because the AltersTraumaZentrum DGU® certification is a new and learning system, further advances in procedure will be made, taking into account the experience of the audits conducted and regarding the state of research on orthogeriatric trauma and comanagement. The upcoming recertification of the centres will show the improvement of structures and comanaged care since the first audit 3 years ago. The level of improvement will have an influence on the Criteria Catalogue, which will be revised within the next year. In addition, a White Book on Orthogeriatric Care will be published in the near future.

Author Statement

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Author Contributions

Writing of the manuscript: Ulla Krause, Katrin Jung. *Revision of the manuscript:* Ulla Krause, Katrin Jung.

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Supplemental Material: The article (DOI: 10.1515/iss-2016-0026) offers reviewer assessments as supplementary material.

Reviewer Assessment

Open Access

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*Corresponding author: Ulla Krause,

Akademie der Unfallchirurgie (AUC), Wilhelm-Hale-Straße 46b, 80639 München, Germany

E-mail: atz@auc-online.de

Reviewers' Comments to Original Submission

Reviewer 1: Uli Spiegl

Oct 20, 2016

Reviewer Recommendation Term:	Accept with Minor Revision
Overall Reviewer Manuscript Rating:	65
Custom Review Question(s)	Response
Is the subject area appropriate for you?	2
Does the title clearly reflect the paper's content?	4
Does the abstract clearly reflect the paper's content?	4
Do the keywords clearly reflect the paper's content?	4
Does the introduction present the problem clearly?	4
Are the results/conclusions justified?	4
How comprehensive and up-to-date is the subject matter presented?	5 - High/Yes
How adequate is the data presentation?	N/A
Are units and terminology used correctly?	4
Is the number of cases adequate?	N/A
Are the experimental methods/clinical studies adequate?	N/A
Is the length appropriate in relation to the content?	4
Does the reader get new insights from the article?	4
Please rate the practical significance.	4
Please rate the accuracy of methods.	N/A
Please rate the statistical evaluation and quality control.	N/A
Please rate the appropriateness of the figures and tables.	3
Please rate the appropriateness of the references.	4
Please evaluate the writing style and use of language.	2
Please judge the overall scientific quality of the manuscript.	3
Are you willing to review the revision of this manuscript?	Yes
Comments to Author:	
Interesting illustration of the certification process of the geriatric trauma centers.	
However, the language needs to be edited by a native speaker.	

Reviewer 2: anonymous

Oct 26, 2016

Reviewer Recommendation Term:	Revise with Major Modifications
Overall Reviewer Manuscript Rating:	40
Custom Review Question(s)	Response
Is the subject area appropriate for you?	5 - High/Yes
Does the title clearly reflect the paper's content?	4
Does the abstract clearly reflect the paper's content?	3
Do the keywords clearly reflect the paper's content?	5 - High/Yes
Does the introduction present the problem clearly?	5 - High/Yes
Are the results/conclusions justified?	4
How comprehensive and up-to-date is the subject matter presented?	3
How adequate is the data presentation?	N/A
Are units and terminology used correctly?	N/A
Is the number of cases adequate?	N/A
Are the experimental methods/clinical studies adequate?	N/A
Is the length appropriate in relation to the content?	4
Does the reader get new insights from the article?	2
Please rate the practical significance.	3
Please rate the accuracy of methods.	N/A
Please rate the statistical evaluation and quality control.	N/A
Please rate the appropriateness of the figures and tables.	4
Please rate the appropriateness of the references.	3
Please evaluate the writing style and use of language.	2
Please judge the overall scientific quality of the manuscript.	3
Are you willing to review the revision of this manuscript?	Yes
Comments to Author:	
<p>The manuscript describes the process of certification in orthogeriatrics in Germany. This is a timely and important topic. However, the impact of this paper could be substantially improved by dealing with the following issues:</p> <ul style="list-style-type: none"> - Are there any lessons learnt in this process so far ? Would there be a benefit in modifying certification criteria, e.g., more stringent requirements for outcome quality ? What could be the best practice model, notably in terms of workflow and specialists involved ? - This particular certification process should be compared to other initiatives and recent studies (cf. Prestmo et al. Lancet. 2015;385:1623). - The reflection on certification processes in general (p. 10) is the novelty in this paper. Are there preliminary data showing that this particular orthogeriatric certification has already contributed to an improvement of patient care ? - There needs to be a language revision. Moreover, the presentation should be more factual. Minor details of the certification process (p. 3 - „seven hour visit“, etc.) can be omitted. In general, statements should be supported by data or references. <p>Minor issues:</p> <ul style="list-style-type: none"> - The aim of publishing this particular paper should be clearly stated in the abstract. - There is no definition of the notion ‚geriatric patient‘. - Parts of the information given in chapter 4 can be provided in an additional table. 	

Authors' Response to Reviewer Comments

Nov 16, 2016

Reviewer #1 and #2

Language was edited by a native speaker

Reviewer #2

Q - Are there any lessons learnt in this process so far ? Would there be a benefit in modifying certification criteria, e.g., more stringent requirements for outcome quality ? What could be the best practice model, notably in terms of workflow and specialists involved ?

A - It is a new certification and data are collected for only one year now. Some smaller adjustments of the process were made but not on criteria or requirements mostly regarding the certification process. First studies on orthogeriatric care and possible improvements in the certified centers will follow in the near future.

Q - This particular certification process should be compared to other initiatives and recent studies (cf. Prestmo et al. Lancet. 2015;385:1623).

A - since this article is an illustration of the certification process and not a study, a comparison to other studies is not possible. Nevertheless, where applicable, other studies were mentioned.

Q - The reflection on certification processes in general (p. 10) is the novelty in this paper. Are there preliminary data showing that this particular orthogeriatric certification has already contributed to an improvement of patient care?

A - A study using data from Registry pilot phase was handed in last week (not published yet!). Some results were added to this article

Reviewers' Comments to Revision

Reviewer 2: anonymous

Nov 17, 2016

Reviewer Recommendation Term:	Accept
Overall Reviewer Manuscript Rating:	50
Custom Review Question(s)	Response
Is the subject area appropriate for you?	5 - High/Yes
Does the title clearly reflect the paper's content?	5 - High/Yes
Does the abstract clearly reflect the paper's content?	3
Do the keywords clearly reflect the paper's content?	5 - High/Yes
Does the introduction present the problem clearly?	5 - High/Yes
Are the results/conclusions justified?	4
How comprehensive and up-to-date is the subject matter presented?	3
How adequate is the data presentation?	N/A
Are units and terminology used correctly?	N/A
Is the number of cases adequate?	N/A
Are the experimental methods/clinical studies adequate?	N/A

Is the length appropriate in relation to the content?	4
Does the reader get new insights from the article?	2
Please rate the practical significance.	3
Please rate the accuracy of methods.	N/A
Please rate the statistical evaluation and quality control.	N/A
Please rate the appropriateness of the figures and tables.	4
Please rate the appropriateness of the references.	3
Please evaluate the writing style and use of language.	3
Please judge the overall scientific quality of the manuscript.	3
Are you willing to review the revision of this manuscript?	No: I do not have further remarks.
Comments to Author:	
-	

Reviewer 3: Ulf Culemann

Nov 24, 2016

Reviewer Recommendation Term:	Accept
Overall Reviewer Manuscript Rating:	N/A
Custom Review Question(s)	Response
Is the subject area appropriate for you?	4
Does the title clearly reflect the paper's content?	5 - High/Yes
Does the abstract clearly reflect the paper's content?	5 - High/Yes
Do the keywords clearly reflect the paper's content?	5 - High/Yes
Does the introduction present the problem clearly?	5 - High/Yes
Are the results/conclusions justified?	4
How comprehensive and up-to-date is the subject matter presented?	5 - High/Yes
How adequate is the data presentation?	4
Are units and terminology used correctly?	5 - High/Yes
Is the number of cases adequate?	N/A
Are the experimental methods/clinical studies adequate?	N/A
Is the length appropriate in relation to the content?	5 - High/Yes
Does the reader get new insights from the article?	5 - High/Yes
Please rate the practical significance.	4
Please rate the accuracy of methods.	N/A
Please rate the statistical evaluation and quality control.	N/A
Please rate the appropriateness of the figures and tables.	5 - High/Yes
Please rate the appropriateness of the references.	5 - High/Yes
Please evaluate the writing style and use of language.	5 - High/Yes
Please judge the overall scientific quality of the manuscript.	4
Are you willing to review the revision of this manuscript?	Yes
Comments to Author:	
-	