

Volume 15, 20 October 2015

Publisher: Uopen Journals

URL: <http://www.ijic.org>

Cite this as: Int J Integr Care 2015; ETC Conf Suppl; [URN:NBN:NL:UI:10-1-117172](https://nbn-resolving.org/urn:nbn:nl:ui:10-1-117172)

Copyright: 

---

Conference Abstract

### 3D imaging for telemedical use

**Line Bisgaard Jørgensen**, MD, PhD student, Department of Endocrinology, Odense University Hospital, Denmark

**Benjamin Schnack Rasmussen**, MD, PhD student, Department of Endocrinology, Odense University Hospital, Denmark

**Knud Yderstræde**, MD, PhD, consultant, associate professor, Department of Endocrinology, Odense University Hospital, Denmark

Correspondence to: **Line Bisgaard Jørgensen**, E-mail: [line.bisgaard.joergensen@rsyd.dk](mailto:line.bisgaard.joergensen@rsyd.dk)

---

### Abstract

**Introduction:** Telemedicine can be used for healthcare professionals to assess ulcer healing from digital images at remote settings. Currently telemedical wound monitoring is based on two-dimensional images. During recent years three-dimensional techniques have been developed including laser scanners, stereophotogrammetry and structured light technique. Some of these methods are also able to assess ulcer characteristics. However, few methods have the potential to be used in telemedicine. We have developed a handheld 3D camera that is able to measure ulcer size including volume and to assess ulcer characteristics. A pilot study by Rasmussen *et al.* (1) investigated the 3D camera and ulcer characteristics in 36 ulcers in 30 patients using the 3D camera and found a better correlation to clinical assessment (gold standard) compared to 2D images (iPhone 4s) used in telemedical care. The purpose of an on-going clinical research study is to evaluate intra- and inter-rater variability in ulcer area and volume measurement using the above-mentioned 3D camera in a different study set-up.

**Methods:** A comparative study is conducted to evaluate intra- and inter-rater variability in ulcer area and volume measurements using the 3D camera. The measurements are compared to ulcer area measurements using standard 2D images (iPhone 5s) and volume measurements obtained by gel injection into the wound cavity. Four clinicians perform the measurements in 48 ulcer patients. In accordance with a predetermined study design, four ulcer area and volume measurements are performed using the 3D camera. Additionally, two area measurements using the 2D images, and two volume measurements by gel injection into the wound cavity are performed for each ulcer. A total of 288 ulcer area and volume measurements are performed.

**Results:** Preliminary results reveal high accuracy in area measurements (measurement error 3.5-3.8%) and volume measurements (measurement error 0.3-0.4%) by the 3D camera.

**Conclusion:** 3D images provide better clinical information compared to standard 2D images. An on-going clinical research study evaluates the accuracy and reliability of area and volume measurements using the 3D camera. The 3D camera has the potential for use as a more advanced technique to assess ulcer healing in telemedical care.

Information of the manufacturer can be found at <http://www.teccluster.com>. However, the 3D camera is currently not commercially available. The estimated cost of the 3D camera is 6,700-13,400 euros.

## Keywords

**three-dimensional; imaging; measurement accuracy; ulcer characteristics; telemedicine**

---

## References

1. Rasmussen BS, Froekjaer J, Joergensen LB, Halekoh U, Yderstraede KB. Validation of a new imaging device for telemedical ulcer monitoring. *Skin Res Technol.* 2015 Mar 20. doi: 10.1111/srt.12218. [Epub ahead of print]

