Teaching Arthroscopy: Analysis of Verbal Communication in the Operating Room

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ABSTRACT

Objective evaluation of training performance remains a challenge in assessing the effectiveness of new training methods in the operating room. A classification method for verbal communication was adopted to analyze typical communication patterns in teaching arthroscopy and to verify its potential as evaluation tool. Four residents who were supervised by either one of two participating surgeons performed 18 operations that were recorded and classified. Typical communication patterns were identified, where types relevant for active learning ('questioning' and 'feedback') were infrequently used. More research is required to confirm if documentation of verbal communication is suitable to assess training performance objectively.

Author Keywords

Arthroscopy, communication, training, performance, classification.

INTRODUCTION

Arthroscopy (minimally invasive surgery in joints) as an alternative to open operative treatment is a beneficial option for patients [1-3]. Arthroscopic operation techniques require high surgical skills and show long learning curves [4-6]. In modern medicine, with the overall demand for high quality care in contrast to a reduced period of time for residents to develop their arthroscopic skills, changes in training methods are initiated [7;8]. From this perspective, it is worthwhile to optimize the learning effect per operation. Objective evaluation of training performance remains a challenge in assessing the effectiveness of new training methods in the operating room. Verbal communication reflects the interaction between the surgeon and the resident. Recently, an objective classification method was introduced based on the type and the content of the verbal communication during surgical training [9]. The goals were to adopt this classification method for an arthroscopic setting, to analyze typical communication patterns and to verify its potential use in objective assessment of training performance.

METHODS

Within a period of two times 3 months, 18 arthroscopic knee procedures were recorded with a special capturing system consisting of two video cameras – one from the

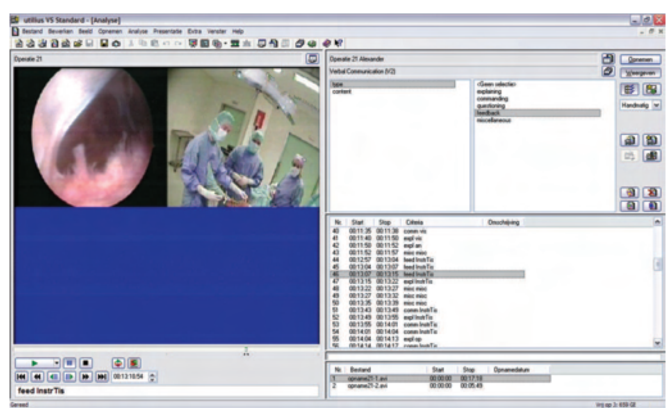

Figure 1. Screenshot of software used to analyze verbal communication.

	Total	Explaining	Commanding	Questioning	Feedback	Miscellaneous
Total	100.0%	38.8%	27.4%	5.7%	10.6%	17.4%
Operation Method	4.2%	3.6%	0.1%	0.1%	0.5%	0.0%
Anatomy and pathology	17.7%	14.8%	0.0%	2.4%	0.5%	0.0%
Instrument handling and tissue interaction	35.7%	13.0%	14.2%	2.0%	6.4%	0.1%
Visualization	24.9%	7.4%	13.1%	1.2%	3.2%	0.0%
Miscellaneous	14.0%	0.0%	0.1%	0.1%	0.0%	13.9%
Indefinable	3.5%	0.0%	0.0%	0.0%	0.0%	3.5%

Table 1. Crosstabs for type (upper row) and content (left column) categories as percentage of total events.

arthroscopic camera and one of the hands of the residents (digital CCD camera, 21CW, Sony CCD, Tokyo, Japan) - and a tie-clip microphone (ECM-3003,Monacor, Bremen, Germany) that was mounted on the supervising surgeon. The video images were combined by a colour quad processor (GS-C4CQR, Golden state Instrument co., Tustin, USA) and digitized simultaneously with the sound by an A/D-converter (ADVC 110, GV Thomson, Paris, France). Four residents who were supervised by either one of two participating surgeons performed the operations. The four **communication types**, previously introduced, were adopted Blom et al. [9]: explaining, questioning, commanding and miscellaneous (Table 1). As this study specifically focuses on training, one category was added: feedback which concerns judgment of the teaching surgeon on the actions of the resident. Categories for **communication content** were discussed and refined by analyzing two operations performed by different residents until mutual agreement in scoring behavior was achieved by two observers. This resulted in six domains: operation method (that has an accent on steps that have to be taken in the near future e.g. start creating the second portal), anatomy and pathology, instrument handling and tissue interaction (e.g. open punch, reposition instrument, stress joint, increase portal size, push meniscus backwards), visualization (e.g. move scope, irrigation, focus), miscellaneous (general or private), and indefinable (Table 1). All digitized videos of the operations were analyzed with Utilius VS 4.3.2 (Campus-Computer-Center, Leipzig, Germany), where one observer marked all communication events and assigned them into proper categories (Fig. 1). Communication on one type and one content was marked as one event independently of its length. The frequency of events as percentage of total events in each of the categories was determined (Table 1). Subsequently, a multivariable linear regression analysis was performed to determine if the teaching surgeon and the experience of the residents significantly influenced the frequency of communication events per minute ($p < 0.05$).

RESULTS

On average 6.0 (SD 1.8) communication events took place every minute. The communication types ‘explaining’ and ‘commanding’ show considerable frequency compared to ‘questioning’ and ‘feedback’ (Table 1). The explaining events were primarily on ‘anatomy and pathology’ followed by ‘instrument handling and tissue interaction’. The commanding events were primarily on ‘instrument handling and tissue interaction’ and ‘visualization’, which in general were the most frequent communication content categories (Table 1). A difference in mean events per minute was found between both teaching surgeons ($p < 0.05$). No significant correlation was found between the frequency of events and the experience of the residents.

CONCLUSION

The results highlight distinctive communication patterns. The relative high frequency of the types ‘explaining’ and ‘commanding’ as opposed to ‘questioning’ and ‘feedback’ is noticeable as the latter two stimulate active learning in general. Additionally, explaining on the contents ‘anatomy and pathology’ and ‘instrument handling and tissue interaction’ is considerable. These items are particularly suitable for training outside the operating room. If trained so, more options are left to focus on other learning goals. As a clear difference was present between the frequency of events per minute amongst the surgeons and no correlation was found for the experience of residents, we cannot confirm that this method is suitable as objective evaluation tool for new training methods. Additional research is recommended with a larger group of residents to minimize the effect of outliers.

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