Plastering Skills In The Emergency Department

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Citation

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Abstract

Immobilisation of fractures with Plaster of Paris casts are a frequent treatment provided by Emergency Departments. A well applied plaster can provide safe and comfortable immobilization of a fracture while incorrect application can result in severe consequences for the patient. In our observational study we surveyed Doctors in Emergency Departments at two Sydney metropolitan Hospitals to assess experience, knowledge and ability in plaster application. This study demonstrates that there is a large variation in experience, confidence and skills amongst Emergency Doctors. Lack of formal teaching and experience were identified as contributors to insufficient knowledge in plaster application.

BACKGROUND

Musculoskeletal injuries requiring immobilization by Plaster of Paris cast are a common cause of Emergency Department presentations. Fractures account for 2% of all hospital episodes leading to over 150,000 admissions per year in Australia [1]. While application of plaster is an integral part of emergency department patient management, there is often no requirement for Emergency Doctors to receive formal training in the art of plaster application [2].

A well applied plaster can provide safe and comfortable immobilization of a fracture prior to operative management or as part of definitive management of an injury. A poorly or incorrectly applied plaster can result in failure of immobilization resulting in ongoing pain and deformity, pressure necrosis of the skin, compartment syndrome, stiffness, thermal injury and nerve palsy [3].

There are many different techniques and methods of plaster application. However there are several fundamental principles used in plaster immobilization. Regardless of the splinting technique used, a functional yet safe plaster must be strong enough to provide immobilization yet respect the soft tissues.

Our experience as an Orthopaedic unit at a busy Sydney metropolitan Hospital is that failure to follow the above principles can result in preventable can result in suboptimal fracture management care. Plaster is often applied by junior medical doctors who may lack adequate knowledge, skill and training in plaster technique. A study by Taylor [4] showed that 16% of new interns had never applied a plaster prior to the commencement of their terms. A study by Zhu et al. [5] showed that interns will apply an average of 16 plasters during their 8 week rotation. This highlights the fact while junior Emergency Doctors apply many plasters, they may be doing so with insufficient skills, experience or knowledge.

The aim of this study is to investigate and describe the skill and knowledge emergency doctors have in applying plaster for the immobilization of fractures at 2 busy Sydney Metropolitan Hospitals.

METHODS

We surveyed junior and senior medical Doctors at 2 separate busy emergency departments in metropolitan Sydney teaching Hospitals. All emergency medical staff rostered on during a 2 week period at both hospitals were included in the study. A paper based survey was conducted whereby staff were approached and asked to complete the short questionnaire on the spot before returning it to the researcher. Participants were asked a variety of questions including:

Data analysis including data entry and Pearson's correlation was performed using the Statistical Package for the Social Sciences (SPSS)

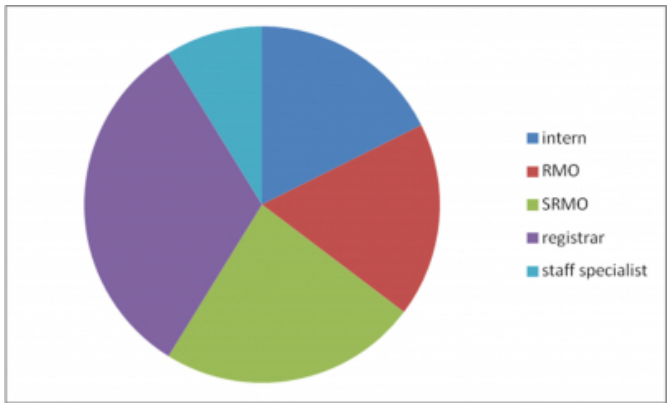
RESULTS

60 Doctors across 2 busy Sydney metropolitan hospitals were surveyed. 34 doctors completed the survey (56% response rate). The majority (32%) of doctors surveyed were registrars (figure 1). More than half of the Doctors surveyed

had not completed a term in Orthopaedics in the past.

Figure 1

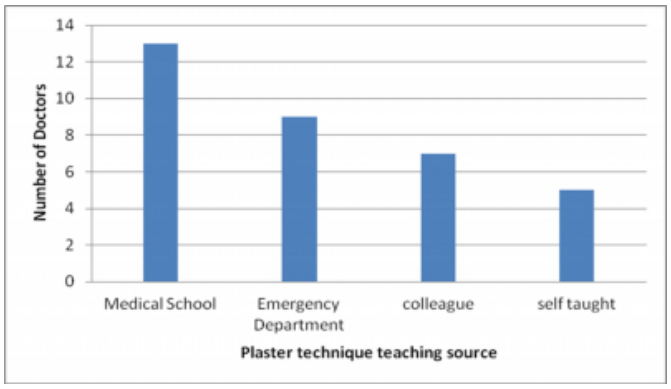
Figure 1: Level of training of Doctors surveyed



Most Doctors stated that they were educated in plaster technique while at medical school (n=13). 38% were taught by a colleague or self taught in plastering technique while at work. Less than 1/3 had formal training provided by the Emergency Department (figure 2).

Figure 2

Figure 2: Plaster technique education



21% of Doctors surveyed had never applied an upper limb plaster during their training in the Emergency Department. Doctors were more experienced in applying lower limb casts with 29% of Doctors having applied more than 50 plasters (figure 3). More than half of those surveyed stated that they at least moderately confident in plaster application (figure 4).

Figure 3

Figure 3: Number of casts applied by Emergency Doctors

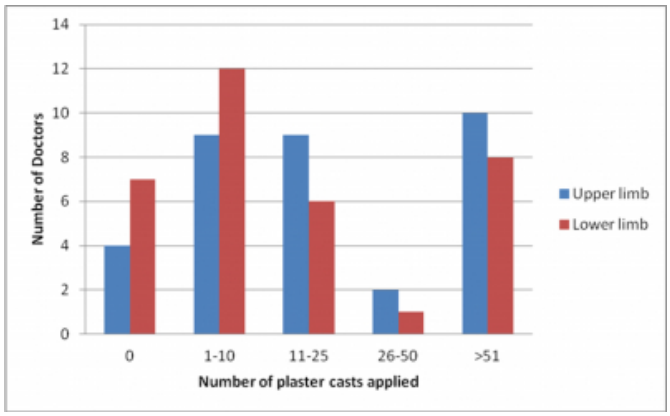
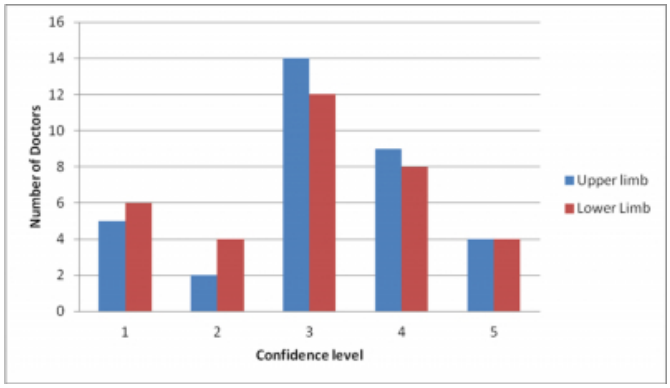


Figure 4

Figure 4: Confidence score in applying casts (1 – not confident, 5 – very confident)



52.9% of those surveyed did not know how to apply an upper limb plaster correctly and 44.1% did not know how to apply a lower limb plaster correctly. This correlated with the level of experience as measured by number of plasters applied in figure 4 (pearsons 0.788, P=0.11).

DISCUSSION

Correct plastering technique is an important skill in the emergency department as part of the management of musculoskeletal injuries. However, there is often no requirement for emergency physicians to receive formal training in the art of plaster application, resulting plaster that may not immobilize a fracture sufficiently or in fact harm the patient.

There are several fundamental principles in the application of plaster. All bony prominences should be well padded and the plaster should allow for swelling post injury. This is especially true in the acute setting in the emergency department. An attempt should be made to immobilize the

joint below and above the injury and the joints themselves must be immobilized in a position that will allow early functional return once removed. Unnecessary immobilization of extra joints or immobilization of joints in extreme flexion or extension can lead to stiffness and impaired function in these joints[6]. The plaster itself must consist of enough layers to provide solid and strong immobilization for the duration of treatment. Finally, careful attention must be paid to the neurovascular status pre and post casting with advice given to the patient on discharge[7].

Participants were surveyed about specific plaster techniques based on our observations of incorrectly or poorly applied plasters for common fracture patterns. Common mistakes made include incorrect joints immobilized or joints immobilized in positions that lead to displacement of the fracture, stiffness and loss of function.

The 34 emergency Doctors surveyed comprised of a wide range of skill levels and experience from interns through to qualified Staff Specialists. At both Hospitals plasters are applied exclusively by Emergency Doctors except in cases were a physiotherapist is available during business hours. The number of plasters Doctors had applied correlated with the level of training with the majority of the 20% who had never applied a plaster being interns. This also correlated well with the level of confidence with more senior doctors who had applied more plasters being more confident in doing so as a result.

Being taught correctly in the principles of plaster application is fundamental in safe and effective management of fractures in the emergency department[8]. Surprisingly, almost 40% of those surveyed stated that the only time they had been taught how to apply a plaster was during medical school. Less than 1/3 had ever had any formal training by the emergency department in plaster application.

When surveyed about some fundamental principles in plaster application, less than half of doctors could correctly identify all the correct factors that make a safe and effective limb immobilization device. This knowledge correlated with level of experience and confidence.

CONCLUSION

Plaster immobilization for fractures are an effective way of providing analgesia, fracture reduction and protection of soft tissues as part of definitive management or until operative fixation. However, incorrectly applied plasters may fail to provide effective immobilization leading to pain and deformity or even harm the patient if soft tissues are not protected.

Our observational study shows that while plaster application is a common service provided by Doctors in the emergency department, there is a large variation in experience, confidence and skills. Lack of formal teaching and experience were identified as contributors to insufficient knowledge in plaster application.

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