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ORIGINAL ARTICLE

ANALYSIS OF VIDEOS ABOUT INTRAOSSEOUS PUNCTURE: A STEP TO PATIENT SAFETY

ANÁLISE DE VÍDEOS SOBRE PUNÇÃO INTRAÓSSEA: UM PASSO PARA A SEGURANÇA DO PACIENTE

ANÁLISIS DE VIDEOS SOBRE PUNCIÓN INTRAÓSEA: UN PASO PARA LA SEGURIDAD DEL PACIENTE

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ABSTRACT

Objective: to analyze the achievement of intraosseous puncture procedure (IPP) on *YouTube* videos. **Method:** It is a descriptive, exploratory, cross-sectional study, conducted at the site of *YouTube* videos sharing. The descriptor Health Sciences Headings (DeCS) "intraosseous infusions" was used for videos in Portuguese, English and Spanish, with a deadline of posting until March 30th 2013, without restrictions of time. The sample consisted of six videos. **Results:** the videos had an average of 3.32 minutes and 5,744 hits. Steps of removing IPP device and antisepsis of the puncture site were mostly disregarded. **Conclusion:** the videos analyzed had flaws that could compromise patient safety when they are used as a learning tool for the IPP. It is highlighted the importance of the nurse as a professional responsible for developing educational materials. **Descriptors:** Nursing; Intraosseous infusions; Movies and Educational Videos.

RESUMO

Objetivo: analisar a realização do procedimento de punção intraóssea (PIO) veiculado nos vídeos do *YouTube*. **Método:** estudo descritivo e exploratório, de delineamento transversal, realizado no sítio de compartilhamento de vídeos *YouTube*. Utilizou-se o Descritor em Ciências da Saúde (DeCS) "infusões intraósseas" para vídeos em Português, Inglês e Espanhol, com data de postagem de até 30 de março de 2013, sem restrições do tempo de duração. A amostra consistiu em seis vídeos. **Resultados:** os vídeos tiveram média de 3,32 minutos de duração e 5.744 acessos. Foram desrespeitadas, principalmente, as etapas de remoção do dispositivo de PIO e a antisepsia do local de punção. **Conclusão:** os vídeos analisados apresentaram falhas que podem comprometer a segurança do paciente quando estes são utilizados como ferramenta de aprendizagem para a PIO. Ressalta-se a importância do enfermeiro como profissional responsável pela elaboração de materiais educativos. **Descritores:** Enfermagem; Infusões Intraósseas; Filmes e Vídeos Educativos.

RESUMEN

Objetivo: analizar la realización del procedimiento de punción intraósea (PIO) vehiculado en los videos de *YouTube*. **Método:** estudio descriptivo y exploratorio, de delineamiento transversal, realizado en el site de vídeos *YouTube*. Se utilizó el Descriptor en Ciencias de la Salud (DeCS) "infusiones intraósseas" para videos en Portugués, Inglés y Español, con fecha hasta 30 de marzo de 2013, sin restricciones del tiempo de duración. La muestra consistió en seis videos. **Resultados:** los videos tuvieron media de 3,32 minutos de duración y 5.744 accesos. No fueron respetadas, principalmente, las etapas de remoción del dispositivo de PIO y la antisepsia del local de la punción. **Conclusión:** los videos analizados presentaron fallas que pueden comprometer la seguridad del paciente cuando estos son utilizados como herramienta de aprendizaje para el PIO. Se resalta la importancia del enfermero como profesional responsable por la elaboración de materiales educativos. **Descritores:** Enfermería; Infusiones Intraósseas; Películas y Videos Educativos.

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INTRODUCTION

In urgent and emergency situations, the circulating blood volume can be reduced and cause the collapse of the peripheral vessels, making it difficult to quickly obtain insurance peripheral venous access for infusion of fluids and medicines to reverse the critical situation. In these circumstances, the intraosseous access is the second option indicated by the *American Heart Association* as an access way used for resuscitation.¹⁻²

In anatomical and physiological terms, the bone is penetrated by blood vessels that pass through its compact structure and its canaliculus until filled by red bone marrow spaces.³ Thus, the bone does not present the risk of collapse due to the stiffness of its structure, and allows quick and direct absorption of these substances at the same dosage indicated for the intravenous way.²

The intraosseous way is indicated for access to the systemic circulation in urgent and emergency situations such as cardiopulmonary arrest, hypovolemic shock, severe burns, prolonged epilepticus status and severe dehydration. This way allows the administration of fluids, electrolyte solutions and blood products, as well as analysis of the medullary blood, identification of acid-base and electrolyte disorders. The intraosseous access is contraindicated in cases of imperfect osteogenesis, osteoporosis and fracture in the limb to be punctured and infected burns.⁴⁻⁵

Among the puncture places, the most common are the proximal and distal tibia, the head of the humerus, sternum, distal radius, distal ulna, the femur and the iliac crest. The intraosseous way is suitable for all ages, except for neonates, where it is preferable to access the umbilical vein when peripheral venous access is not obtained.⁶⁻⁹

The intraosseous puncture (IPP) can be performed using various devices: manuals inserted by applying the force; the automatic insertion consisting of an internal spring that applies force to penetrate the spinal canal; and electrical, formed by bone puncture, which performs rotations to the needle be inserted.¹⁰

To perform IPP, a procedure for which nurses are enabled,¹¹ it must be followed basic steps, where the most cited in the literature are: to identify and place the puncture; use sterile gloves; to do local antisepsis; to verify the size of the needle according to the patient; stabilize the limb to be punctured in a flat surface; to re-identify the puncture place; to insert the needle at the puncture place with an angle of 90 ° to

overcome resistance; to remove the needle guide of the IPP; to observe whether the needle is correctly positioned, bone marrow aspirate and infuse saline to see if there is resistance and infiltration; to connect the equipment; to fix the punctured member and the equipment.⁶⁻⁸

It is recommended that the intraosseous access keeps only in the period required for the stabilization of the patient's health and securing a safe venous access. The maximum time for using the intraosseous way should be 24 hours due to the loss of its efficiency and the risk of complications, including leakage, osteomyelitis, compartment syndrome and fat embolism.¹²

The quality of care in situations of emergency care is achieved by not worsen the condition of the patient, minimize complications and seek hemodynamic stability in the shortest possible time. To reduce the risk of errors, the professional must be prepared and understand the importance of their activities, which is possible from a theoretical support, as well as critical and reflexive thinking.¹³ Within the context of urgency and emergency the nurse acting more closely and realize greater number of interventions to the patient, should bother to provide safe care.

The success in obtaining intraosseous access without harming the patient, is related to the professional training and knowledge about the ethical and legal aspects of the procedure. The IPP is legally authorized to be performed by nurses,¹¹ if he is able to manipulate materials and comply with the necessary technical steps. It is known, however, that the teaching of emergency care is still at the beginning in Undergraduate Nursing in Brazil and adds and IPP is addressed only incidentally in the literature, despite not being a recent procedure because it is from 1922.²

The professional search on the internet the audiovisual resources to answer questions, to know the technique and related procedures, including IPP care, and *YouTube* site¹⁴ is among the most accessed worldwide by lay and scientific community in the frequent search for this knowledge.

With this problem, this study aimed to analyze the implementation of the intraosseous puncture procedure (IPP) in videos of *YouTube*¹⁴ and it has its relevance in the fact that IPP first alternative when the venipuncture is not obtained quickly, requires training of professionals for the procedure to be successful, with a view to quality of care, with the pillar patient safety.

METHOD

This is a descriptive study with quantitative and cross-sectional approach, using population as the videos available on the IPP website shared on *YouTube* videos,¹⁴ which was chosen for being the most accessed and known worldwide among Internet users. The sample corresponding to six videos.

The procedure for data collection was based on the following question: Does the information presented on *YouTube* videos about IPP follow the appropriate steps to the correct use for this procedure?

To answer this question, the data search was performed using the descriptor Health Sciences Headings (DeCS) "intraosseous infusions" for videos with emphasis on IPP and as inclusion criteria the videos in Portuguese, English and Spanish was taken with a deadline of posting until March 30, 2013, without restrictions of time duration. Exclusion criteria consisted of the videos did not approach the subject under study, as well as duplicates.

The visits to the site were made by pairs, in April 2013, on different computers, following a protocol of analysis elaborated from the IPP steps identified in literature.⁶⁻⁸

Data were tabulated and evaluated as simple descriptive statistics, presented in absolute and relative frequencies, through graphs and tables.

By engaging public domain information, this study did not require consideration of the Ethics in Research.

RESULTS

By using the descriptor listed, 11 videos were found on the *YouTube* website, where six corresponded to the inclusion criteria and were part of the final sample of this study (n = 6).

As it can be seen in Table 1, the videos, mostly presented no explanation of the procedure being only of visualization.

Table 1. Distribution of *YouTube* videos about the IPP procedure, as the explanatory audio, video length and number of views (n = 6). Natal, RN, 2013.

Explanatory video	Video time duration (min)	Number of visualizations
English	1,25	8.022
Portuguese	6,71	2.870
Without explanation	4,8	4.823
Without expllanation	3,11	156
Without explanation	1,0	8.872
Without explanation	3,08	9.721
Average	3,32	5.744
Minimum	1,0	156
Maximum	6,71	9.721

According to the data of Table 1, it is possible to identify that the videos had an average duration of 3.32 minutes with a minimum of 156 views, which corresponded to average 5,744 accesses.

Regarding the year of posting, the videos were homogeneously distributed, as shown in Figure 1, with about a video per year (average = 1.2) on IPP from 2009.

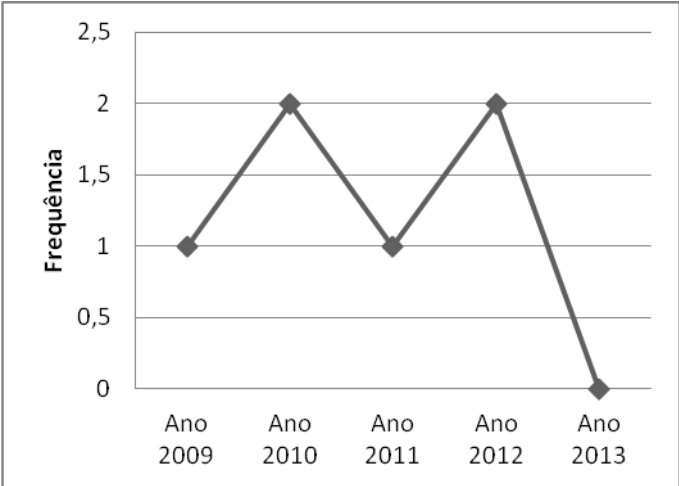


Figure 1. Distribution of videos about the IPP procedure as the year of posting on *YouTube* website (n = 6). Natal, RN, 2013.

With regard to the device to perform the IPP procedure, most of the videos

used bone drilling electric devices, as can be seen in Table 2.

Table 2. Distribution of the video devices used according to the IPP procedure (n = 6). Natal, RN, 2013.

Device used	n	%
Automatic	2*	33,33
Electric	3	50
Manual	2	33,33
Total	6	100

* Note: in one of the videos, more than one device was used to perform the IPP.

According to Table 1, it can be seen that as the insertion site, it was observed that the

tibia was more used to the IPP, both in adults and children and animal models.

Insertion site	Model used
Proximal tibia	Adult (human)
Tibia	Animal (pig and chicken)
Proximal tibia and humeral head	Adult (human)
Tibia	Animal (alligator)
Proximal tibia	Adult (synthetic mannequin)
Tibia	Animal (pig)

Figure 2. Distribution of *YouTube* videos about the IPP according to the insertion site and model used. Natal, RN, 2013.

Regarding the technique demonstrated to the achievement of IPP, 12 items were listed according to the literature in order to base the analysis procedure of the selected videos.

Table 3 shows the results found, which were classified according to their absolute (n) and relative (%) frequency.

Table 3. Distribution of *YouTube* videos about the stages of the technique demonstrated for IPP (n = 6). Natal, RN, 2013.

IPP Stages	n	%
1. Identification and proper position of the puncture place	6	100
2. Use of gloves	6	100
3. Local antisepsis	3	50
4. Choice of the IPP devise	6	100
5. Limb stabilization on flat surface	5	83,33
6. Reidetification of the puncture place	6	100
7. Insertion of IPP needle with 90° angle	5	83,33
8. Removing the IPP needle guide	6	100
9. To observe the needle fixation, trying to aspire the marrow, to infuse solution to check resistance/infiltration	5	83,33
10. To connect the equipment	6	100
11. To fasten the punctured limb and the equipment	5	83,33
12. Removing IPP	2	33,33

From the data presented in Table 3, it is observed that most of the videos did not follow all recommended steps in the literature for the IPP procedure. Step 12, regarding the removal of the IPP device demonstrated in only two videos (33.33%), and step 3, corresponding to the place antisepsis puncture were highlighted and performed on half of the statements (50%).

DISCUSSION

The limited number of videos available on *YouTube*¹⁴ about IPP shows that the treatment of the thematic is not only incipient in the literature, according to others authors⁹ but also the major site for sharing videos from the internet, as evidenced in this study.

It is noteworthy that the videos are most of them demonstrative, without explanation of the technique, although a significant number of accesses have been identified, with an average of 5,744 views per video, which shows public interest in the knowledge of IPP, there

was not improvement in the explanatory quality of the videos and adding more posts over the past few years.

Although the IPP has arisen in 1922,² highlighting its applicability in pre-hospital care, it is observed that the first video posted on *YouTube*¹⁴ about this procedure comes from the year 2009 with just one video, whose average has remained constant and low over the past five years.

As for the devices used to perform IPP, there was a prevalence of electric, also known as bone punctures, which can be explained by the ease of handling, speed to obtain access, greater safety, less risk of transfixing the bond marrow.¹² Rapid obtaining access for infusion of medicine and solutions constitutes a priority in meeting the urgent and emergency situations, especially in cardiorespiratory arrest, main circumstance in which the intraosseous access is used.

IPP places are recommended according to the patient's age, but the region of the tibia is

preferable in all age groups as the first option. In children, the alternative places to the tibia are the femur, humerus and calcaneus. In adults, alternative places are the malleolus, the sternum, the iliac crest and the clavicle. The puncture of the sternum should be avoided in children under three years old due to a chance to transfix the bone, because of its lower density, and risk of causing myocardium perforation.⁶

The tibia was established as the main place of choice for IPP, by having little fat and be easily accessible, and has been used for demonstration in 100% of the videos, with correct identification of the place in all of them. The tibia puncture in children differs from adults, because in the pediatric patient is located tuberosity with the index finger, sliding it up and down medially 1 cm, while in the adult patient, the index finger is slid 2 cm medially and upward.⁶⁻⁷

Removing the IPP needle was demonstrated in a little over 30% of the videos. The infusion of substances by the intraosseous way should be discontinued as soon as they get another access way due to the greater chance of complications after 24 hours of intraosseous infusion.^{6-7,12} The correct IPP needle removal is as important as their inclusion in the prevention of complications,² but it was demonstrated in a minority of videos.

It was found that the local antisepsis was performed in only half of the videos analyzed, which constitutes an important technical failure that may compromise the safety of the patient undergoing IPP, once among the complications of IPP are osteomyelitis, sepsis, cellulitis and abscess occurring primarily attributable to failures in the antisepsis of the puncture place. However, the complications related to infection on the place can be avoided by using an antiseptic such as chlorhexidine 0.5%, for example.^{2,6}

To face various situations, including those related to safe patient care, many students use formal and informal resources in their autonomous development, with the main purpose to acquire skills in performing certain tasks.¹⁵

With technological development and subsequent dissemination of information, it was found the greatest use of available resources on the Internet, such as text, images and videos, as didactic-pedagogic resource in classrooms and the acquisition of individual skills.¹⁵⁻¹⁶

With regard to the *YouTube* videos¹⁴ about IPP, is necessary to improve the quality of this resource, given its easy accessibility, primarily as a learning tool for performing

technical procedures for various complexities that form the essence of nursing care and require different levels of competence.

Then it is emphasized the role of the nurse as a professional educator on strategic and appropriate to the teaching-learning process in order to provide an effective educational environment resources and consequently, safe patient care.

CONCLUSION

The analysis of *YouTube* videos on the website allowed to observe incipient number of posts about the IPP as well as the necessary steps to achieve the correct technique has not been demonstrated in all the videos. This can compromise the safety of the patient undergoing IPP when using these videos as an educational medium, as it was remarkable the considerable number of views, which shows interest lay and/or scientific community about the procedure.

Thus, it becomes necessary to prepare more appropriate videos through not only visual but also with audio explanations to clarify the content that can be explained through this resource in the classroom, in view of the increased use of the internet and technological advances as didactic and pedagogical activity.

It is worth noting that the nurse being legally authorized to perform the IPP and play the role in the care and management, is also present in the continuous and permanent education of the healthcare team. These professionals need to constantly acquire specific skills to mobilize the process of teaching and learning. Therefore, the nurse must be present in the development of appropriate visual resources for training and improvement techniques and when he uses these resources, he should know to evaluate them for the suitability for the promotion of safe care directed the critically ill patient.

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