

Electronic data collection for the analysis of surgical maneuvers on patients submitted to rhinoplasty

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SUMMARY

Introduction: In the health field, computerization has become increasingly necessary in professional practice, since it facilitates data recovery and assists in the development of research with greater scientific rigor.

Objective: the present work aimed to develop, apply, and validate specific electronic protocols for patients referred for rhinoplasty.

Methods: The prospective research had 3 stages: (1) preparation of theoretical data bases; (2) creation of a master protocol using Integrated System of Electronic Protocol (SINPE[®]); and (3) elaboration, application, and validation of a specific protocol for the nose and sinuses regarding rhinoplasty.

Results: After the preparation of the master protocol, which dealt with the entire field of otorhinolaryngology, we idealized a specific protocol containing all matters related to the patient. In particular, the aesthetic and functional nasal complaints referred for surgical treatment (i.e., rhinoplasty) were organized into 6 main hierarchical categories: anamnesis, physical examination, complementary exams, diagnosis, treatment, and outcome. This protocol utilized these categories and their sub-items: finality; access; surgical maneuvers on the nasal dorsum, tip, and base; clinical evolution after 3, 6, and 12 months; revisional surgery; and quantitative and qualitative evaluations.

Conclusion: The developed electronic-specific protocol is feasible and important for information registration from patients referred to rhinoplasty.

Keywords: rhinoplasty; medical informatics; database.

INTRODUCTION

Computerization is becoming increasingly necessary to professional practice in several fields, including the health area, because it eases the recovery of stored data. Further, it is being used to promote the production of research with a high degree of scientific rigor. The development of data bases with systematically organized information permits the use of computerization in scientific work and thereby results in more reliable conclusions. Therefore, the improvement of data collection via computerization is indisputably important.

The Integrated System of Electronic Protocol (SINPE[®], intellectual property of Professor Osvaldo Malafaia) was created in 1999 and has been registered with the

National Institute of Industrial Property (INPI) under the number 00051543 (1). The system enables the development of research in the otorhinolaryngology and facial plastic surgery fields with greater readiness and versatility in data collection, allowing the immediate sharing of information within the scientific community.

The present study integrates the line of research named "Computerized Protocols" from the post-graduation program at the Surgical Clinic of the Division of Health Sciences at Federal University of Parana.

METHOD

For developing a theoretical database, all necessary information in the field of otorhinolaryngology and facial

plastic surgery was gathered from text books and published periodicals (22). Once the information was compiled, an electronic database was created using the Microsoft Word and Microsoft Excel programs. Afterwards, the generated files were converted to text format archives to enable their incorporation into SINPE®.

We created a master protocol containing 20,109 items. The structure incorporates practical sorting and is constituted of anamnesis, general physical examinations, complementary exams, and clinical treatment. For each area, as determined from the physical exam, the information is specific and encompasses the diagnosis, surgical treatment, complications, and follow-up. A specific protocol termed "Rhinoplasty" was created from 954 items. Two different manager protocols were developed to organize data in the software: (1) a master protocol that works as a receptacle for information related to otorhinolaryngologic diseases but in a non-selective manner and (2) a specific protocol that selects, covers, and groups exclusive information from determined fields of practice.

RESULTS

After concluding the elaboration and review of the master protocol (20,209 items), which encompassed the greater field of otorhinolaryngology, we hierarchized an idealization of the specific protocol (954 items) containing the entire subject related to patients with aesthetic and functional nasal complaints referred to surgical treatment (i.e., rhinoplasty) into 6 main categories related to research: anamnesis, physical examination, complementary exams, diagnosis, treatments, and outcome.

For the present research, we used the categories of treatment and outcome (main roots) and their sub-items, as listed below.

1. Finality
2. Accesses
3. Surgical maneuvers on the nasal dorsum
4. Surgical maneuvers on the nasal tip
5. Surgical maneuvers on the base of the nose
6. Clinical evolution—3 months
7. Clinical evolution—6 months
8. Clinical evolution—12 months
9. Revision surgeries
10. Qualitative evaluation (satisfaction)
11. Quantitative evaluation (measures of the nose)

1.1 The creation of the master protocol

Clicking on "Protocols" will display the protocol options (master or specific). Clicking on "Data" will present

the option to initiate or simulate data collection or initiate a search. Using the option "Patients," the user can identify or insert a patient in the program, or even consult pre-existing data. By selecting "Doctors," the user is allowed to insert, modify, or exclude a particular professional. In the item "Parameters," one can verify users, access permissions, subscribe to new institutions, and view a unit's fields and fees. Finally, help options are available under the item "Help: protocols system help; how to make security copies; how to restore a security copy; how to send a copy to the central database; and data regarding the program."

By clicking on the icon "+" beside the word root, one can open it to show the content of the master protocol. The icon "+" next to the root of a folder or an archive indicates that the folder or archive is closed (i.e., the content is not exposed). Clicking on the icon "+" will convert it into "X," exposing the content to be used. Along the horizontal column above this icon are shown 5 options in the master protocol: clicking on the blank box beside "View in alphabetic order" will result in the folder contents being shown in alphabetic order. By clicking on "Expand," the folder content is selected and entirely exposed. Conversely, clicking on the option "Reduce" will close the folder. Clicking on the option "Father" will create a new father item. The option "\$" can be used to modify numerical value data, such as fees, procedures codes, and medications. In addition, 3 options are available in the right vertical column: the magnifying glass icon is utilized to perform a search within the entire master protocol and is aimed at finding specific information; by clicking the up and down arrows, the user can alter the position of an item inside the folder. At the bottom of the screen, 5 options can be found in the master protocol: "Add sibling," "Add son," "Remove," "Refresh," and "Visualize in HTML." All options can only be used after opening the root, when the master protocol content is exposed. To close the master protocol and return to the computerized protocol operation, just click on the option "Close" positioned at the right side of the bottom of the screen.

The screen in Figure 1 shows the content corresponding to the master protocol with the opened root. The folders contain clinical data from several otorhinolaryngological pathologies.

When the root is opened, it is possible to list the functions of the options shown at the bottom horizontal line. Clicking on "Remove," the user can exclude a folder or archive selected by using the mouse. To alter the characteristics of a selected folder or archive, such as the orthography, just use the option "Alter" by clicking over it with the mouse. After concluding the desired alteration, the user confirms the text and again includes the folder or archive selected by clicking on the option "Refresh." For

creating and including a new folder or archive of features similar to the ones for the selected item, the user must use the option “Add sibling.” When the archive or folder is a branch of the selected item, the option to be used is “Add son.” The “Visualize in HTML” option permits the transposition of data from the protocol to a Word archive spreadsheet. As explained previously, the option “Close” at the bottom right corner enables the user to close the master protocol.

Since 6 activity fields (ear; face; nose and paranasal sinus; oral cavity; pharynx; and larynx) are present in all the specific protocols, only the folders corresponding to “Clinical condition” and “Physical exam” were determined as general. The remaining folders were applied exclusively in the specific protocol of the activity field.

1.2 Creation of the specific protocol

Using the option “Specific registered protocols,” the user can create a specific protocol for new areas from the master protocol. Afterwards, a new screen will appear with the options “Insert,” “Exclude,” “Alter,” “Cancel,” and “Save.”

Two boards are presented on this screen (Figure 2). The board on the left, with the previously opened root, shows all the folders of the master protocol. The board on the right presents spaces for the specific protocol items. Using both arrows between the boards, the user can transpose data from the master protocol to the specific protocol, selecting them on the board on the left and clicking on the arrow pointing to the right. In the reverse way, clicking on the arrow pointing to the left, the selected item on the board on the right will be transposed to the board on the left. To print or save the specific protocol in HTML format, just click on the existing options at the bottom right line. To save the alterations and close the screen, return to the figure 9 screen, just click on the option “Close.” When the user follows these steps, all items necessary for data collection in the research will be in the specific protocol (Figure 3).

DISCUSSION

Shortliffe (23) defines medical informatics as a field of study in which informatics resources can be applied to the management and utilization of biomedical information. Shortliffe and Blois (24) cite the first application of informatics as the gathering of epidemiological data for the U.S. census. This method was applied in epidemiology from 1920 to 1930. The first reports on the computerization of medical records are from 1970 by the Mayo Clinic (25).

Watts defines 3 important aspects in the computerization in the medical field: requests for increased productivity, diminished costs, and an improvement in the quality of the service (26).

In the 1990s, a series of computerizing systems emerged in the health field for the monitoring of the health

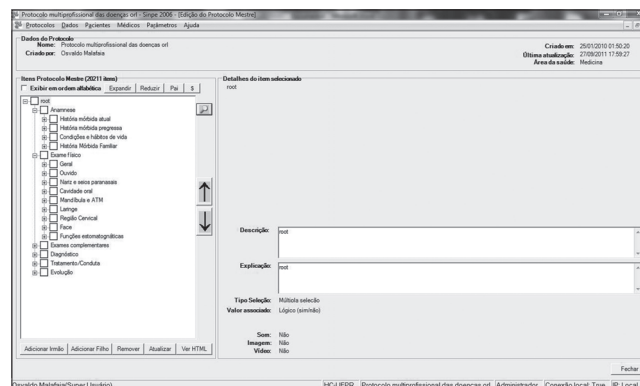


Figure 1. Screen editing master protocol in which the root “Otolaryngology” has been opened.

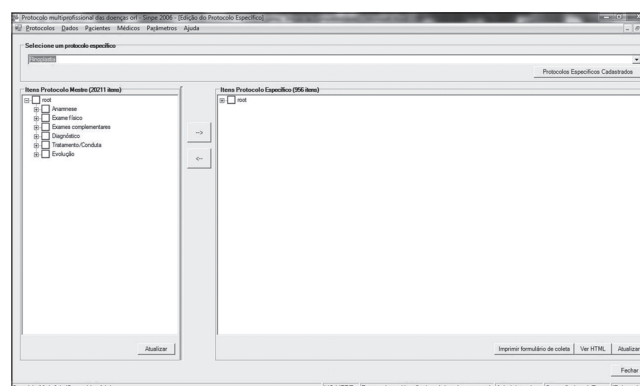


Figure 2. Placing items in a specific protocol.

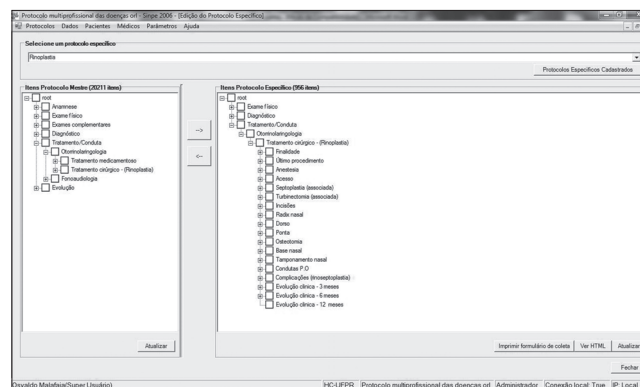


Figure 3. A specific protocol (rhinoplasty) concluded.

care process and increased the quality of assistance to the patient, since these systems assisted in the diagnosis process and therapy prescription. This capacity can be implemented due to intelligent systems, which permit the inclusion of clinical reminders for assistance follow-up, warnings about drugs interaction, alerts in dubious treatments, and deviations from clinical protocols (27).

Electronic protocols, in which questionnaires are filled using the computer, can be used as tools for prospective data collection. These protocols are effective because they enable the inclusion of systematized data through software that permits posterior manipulation by crossing data to generate quality scientific information.

Quality clinical studies are fundamental to continued scientific development. They allow secure access to new information with a consequent improvement of knowledge, goal planning, disclosure of procedure evaluations, and professional conduct.

SINPE® permits the user to create, modify, and add necessary information into master and specific protocols. This type of collected data storage allows the research to inform all parameters of the research (28). Furthermore, the possibility of interconnecting computers and institutions expands the collection and storage of data, which will be of fundamental importance in the development of computerized and multicenter databases in improving reliability.

The creation of a protocol specific to rhinoplasty emerged from the requirement for standardized and reliable information collection and led to the elaboration of descriptive and analytical studies in the field of nasal aesthetics, in which the subjectivity of the evaluations of surgical maneuvers and indications is preponderant.

At large medical centers in Europe and the United States, the computerization of patient data has enabled these difficulties to be resolved and has led to a steady increase in the inclusion of such studies in journals that avoid the subjective nature of data collection (27).

This protocol contains the option of direct filling. This feature enables the researcher to avoid the subjectivity that is characteristic of information collection and that complicates the interpretation of the results in high quality journals. A collector can fill in the initial information on the patient, such as name, age, gender, and insurance. However, a doctor must perform the collection of information related to the medical area, which was encompassed in this study in performed surgical maneuvers, and data related to satisfaction and interpretation of nose measures.

CONCLUSION

Applied in a simple and systematic way, the developed electronic specific protocol (SINPE) is a viable method for registering information on patients with an indication for rhinoplasty.

REFERENCES

1. Malafaia O, Borsato EP, Pinto JSP. Manual do usuário do SINPE®. Curitiba: UFPR, 2003.
2. Adamson PA, Galli S. Rhinoplasty Approache: Current State of the Art. *Arch Facial Plast Surg.* 2005;7(1):32-7.
3. Alsarraf R, Larrabee WF JR. Outcomes research in facial plastic surgery [editorial]. *Arch Facial Plast Surg.* 2001;3:7.
4. Bracaglia R, Fortunato R, Gentilech S. Secondary Rhinoplasty, *Aesthetic Plast Surg.* 2005;29(4):230-9.
5. Corrado A, Bloom J, Becker D. Domal Stabilization Suture in Tip Rhinoplasty. *Arch Facial Plast Surg.* 2009;11(3):194-7.
6. Gruber, R, Weintraub, J, pomerantz, J. Sutura Techniques for Nasal Tip. *Aesthetic Surg J.* 2008;28:92-100.
7. Gunter J. Dallas rhinoplasty – Nasal Surgery by the masters. Quality Medical Publishing. 2006.p.70-92.
8. Guyuron B, Behmand R. Nasal tip sutures part II: the interplays. *Plast Reconstr Surg.* 2003;12(8):1146-9.
9. Leach JL, Athré. Four suture tip rhinoplasty: A powerful tool for controlling tip dynamics. *Otol Head Neck Surg.* 2006;135:227-31.
10. Loe S, Rowe-Jones J. Suture techniques in nasal tip sculpture: Current Concepts. *J Laryngol Otol.* 2007;121:8-10.
11. Luce EA. Outcome studies and practice guidelines in plastic surgery [editorial]. *Plast Reconstr Surg.* 1999;104:1187-90.
12. Maniglia AJ, Maniglia JJ, Maniglia JV. *Rinoplastia Estética Funcional e Reconstructora.* São Paulo: Revinter, 2002. p.129-50.
13. Mckieinan DC. Patient Benefits from Functional and Cosmetics Rhinoplasty. *Clin. Otolaryngol.* 2001;26:50-2.

14. Mocellin M, Pasinato R, Berger CAS, et al. Estreitamento da Base Nasal no Nariz Caucasiano através da Técnica de Cerclagem. *Arq. Int. Otorrinolaringol.* 2010;14(2):199-205.
15. Patrocínio JA. Manobras cirúrgicas realizadas nas rinoplastias de um serviço de residência médica em otorrinolaringologia. *Braz J Otorhinolaryngol.* 2006;72:439-42.
16. Perkins S, Patel A. Endonasal Suture Techniques in Tip Rhinoplasty. *Facial Plast. Surg. Clin. North Am.* 2009;17(1):41-54.
17. Rees TD, Krupp S, Wood-Smith D. Secondary rhinoplasty. *Plast Reconstr Surg.* 1970;46(4):332-40.
18. Rohrich RJ, Adams WP. The Boxy Nasal Tip: Classification and Management Based on Alar Cartilage Suturing Techniques. *Plast Reconstr Surg.* 2001;107:1849-107.
19. Sheen JH. Rhinoplasty: personal evolution and milestones. *Plast Reconstr Surg.* 2002;105:1820-2000.
20. Tebbetts JB. Discussion: nasal tip sutures part I: the evolution. *Plast Reconstr Surg.* 2003;112(8):1146-9.
21. Tardy M, Brown RJ. *Surgical anatomy of the nose.* New York: Raven Press; 1990. p.113-58.
22. Toriumi D, Becker DG. *Rhinoplasty Dissection Manual.* Philadelphia: Lippincott Williams & Wilkins; 1999. p. 37-57.
23. Shortliffe EH. The science of biomedical computing. *Med Inform.* 1984;9:185-93.
24. Shortliffe EH. Medical Informatics: An Emerging Discipline with Academic and Institutional Perspectives, *Journal of the American Medical Association.* 2006;293(8):1114-20.
25. Grimson J. Delivering the electronic healthcare Record for the 21st century. *Int J Med Inf.* 2001;64:111-27.
26. Blum DKA. *A History of Medical Informatics.* New York, ACM Press, 1990.
27. Lima JHF. Implantação e validação do sistema integrado de protocolos eletrônicos (SINPE®) sobre as doenças do aparelho digestivo no Hospital de Clínicas da UFPR. Curitiba, 2008. 84f. Tese (Doutorado em Clínica Cirúrgica) – Setor de Ciências da Saúde, Universidade Federal do Paraná.
28. Frisby AJ. The internet and medical education. *Del Me. Jrl.*, 1996;68(12):602-5.