

# Risk and limits in dental practice: a Portuguese approach to medical-legal evaluation and professional liability

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## KEYWORDS

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## ABSTRACT

Patient safety and quality of healthcare delivery systems are an objective of WHO. This study aims to present and analyse Portuguese clinical data on risk and malpractice in dental practice. Data from the Forensic Dentistry Laboratory (Faculty of Medicine, University of Coimbra) was analysed, between the years of 2013 to 2018. One hundred and seven technical reports were selected, and seventy nine files were included in the iatrogenic sequelae group. Data included the analysis of the performance of dental professionals. Sequelae were divided in descending order of occurrence: 1) mandibular dysfunction (53,2%)[(42)79]; 2) neurological deficit (39,2%)[(31)79]; 3) tooth loss (6,3%)[(5)79]; and 4) opening deficit (1,3%)[(1)79]. Three major areas with significant expression in the field of expert evaluations were analysed: 1) orthodontic treatment (51,9%), implant rehabilitation (29,1%), and oral surgery. Given the prevalence of malpractice, the need to assess its causes and recognise standards for its prevention is necessary.

## INTRODUCTION

In 2002, the World Health Organisation highlighted the problem of patient safety. In the context of public interest, patient safety was associated with the evaluation of the occurrence of good practice.<sup>1,2</sup> The assessment evaluation of professional liability and forensic investigation arises in synergy in obtaining data for a court decision<sup>2</sup>. The data will allow clarification and allocation of medical liability according to the context of medical law: criminal, civil, or labour<sup>2</sup>. An individual's integrity analysed in a medico-legal context is valued according to the guidelines of each country<sup>2</sup>. To ensure the medical safety of patients, it must consider patient factors as well as professional factors. The European Medical Risk-Related History (EMRRH) is an example of a tool to register medical pathology that interferes with dental treatment and to indicate the degree of medical risks in 10 European countries<sup>3</sup>. The professional factor is an unnerving and sensitive topic! There is a consensus that the medical or surgical procedures may lead to a change in patient's health status, physical and mental integrity<sup>4-10</sup>.

Iatrogenic sequelae can be: 1) post-operative complication or risk of the procedure, which means supported by good practice<sup>2</sup> and statistically known<sup>7-12</sup>. In opposition, one can consider malpractice as an incorrect procedure or conduct<sup>2,4,11-15</sup>. Dental malpractice is related to the absence or insufficiency of information between the patient and the health

professional, and it also can be related to the error or delay in the diagnosis and therapeutic failure<sup>11-15</sup>.

A retrospective analysis performed in a dental medico-legal Portuguese database aims to highlight various aspects of malpractice, allowing some reflections on the safety and quality of health care delivery systems in the dental-medical context.

**MATERIAL AND METHODS**

A retrospective analysis was performed using the database of Forensic Dentistry Laboratory of the (Faculty of Medicine, University of Coimbra, Portugal) between 2013-2018. The files were selected according to the inclusion criteria: age between 18 and 65 years old; data of individuals subjected to expert evaluation in the field of post-traumatic body damage, with court decision; victims of road accidents and aggression (traumatic aetiology) that underwent dental rehabilitation. Oncological and genetic pathology were exclusion criteria. The above mentioned oral rehabilitations were performed by different healthcare professionals associated with their Professional Board<sup>17</sup>.

The research team, composed of dental doctors with forensic/orthodontic/prosthetic practice, with medico-legal evaluation

experience, proceeded with the individual/objective examination and carefully informed about the objectives of the study. Informed consent was provided regarding the Helsinki Declaration on human subjects and according to the guidelines of the Ethics Committee of Faculty of Medicine (CE-048/2017).

The causal relationship between the sequel and the description of the traumatic event was ensured in each report. The sequelae were identified and categorised according to the table of disabilities<sup>18,19</sup>. The descriptive analysis of the data was performed, according to 1) the sequel category according to direct or indirect relation with the disease<sup>20</sup> and according to excellent practice performance, risk or malpractice<sup>2</sup>; 2) the dental rehabilitation; and 3) the timeline of the dental rehabilitation.

**RESULTS**

In the database records of Forensic Dentistry Laboratory, 107 cases were selected, between 2013 to 2018. Over 79 cases (73,8%) [(79)107] were judged for iatrogenic sequelae, of which 19 cases (24,1%) [(19)79] were evaluated as malpractice procedures. The mean age of patients filing a complaint was 41 years, with a range from 18 to 65 years, distributed by the female (78%) and male (22%) groups.

**Table 1.** The chart represents the corporal damage assessment and the type of iatrogenic sequel.

Sequelae	Clinical findings			N(%)	107	
	Indirect	Risk/ Malpractice	Direct			28(16.2)
			Clinical Description			
			<b>Tooth Loss</b>	Incisor/Canine/Premolar	5(6.3)	79(73.8)
		<b>Mandibular Dysfunction</b>		Temporomandibular dysfunction	42(53.2)	
				Maxillary atrophy		
				Non-anatomical reduction of mandibular fracture		
			<b>Opening Deficit</b>	Opening restriction	1(1.3)	
		<b>Neurological Deficit</b>		Asymmetry of lip commissures	31(39.2)	
				Hypoesthesia, anesthesia, paraesthesia or dysaesthesia		
				Absence of activity		
				Taste alterations		

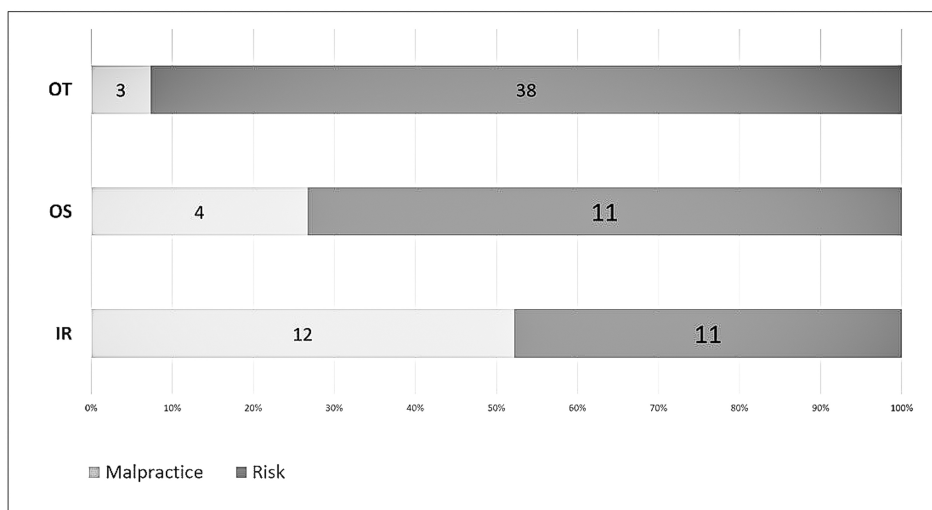
Sequelae were divided, according to disease criteria, into: 1) direct sequelae, resulting from the normal disease evolution (16,2%), and 2) indirect or iatrogenic sequelae, resulting from the technical or scientific intervention of the health professional (73,8%) (table 1). Iatrogenic sequelae group was divided into: a) risk or complication sequelae, resulting from normal consequences of iatrogenic procedure (75,9%)[(60)79], and b) incorrect sequelae, or malpractice, resulting from incorrect practice procedures or failure to comply with good practice (24,1%)[(19)79]. According to clinical evidence and impairment tables<sup>18,19</sup> sequelae were divided in descending order of occurrence: 1) mandibular disfunction (53,2%)[(42)79]; 2) neurological deficit (39,2%)[(31)79]; 3)

tooth loss (6,3%)[(5)79]; and 4) mouth opening deficit (1,3%)[(1)79] (table 1).

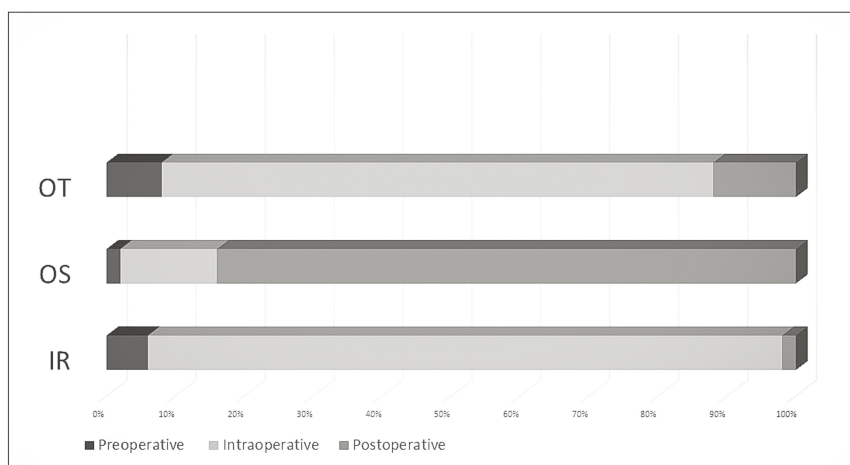
The group of iatrogenic sequelae was divided by rehabilitation fields into: 1) orthodontic treatment (OT) (51,9%)[(41)79], implant rehabilitation (IR) (29,1%)[(23)79], and oral surgery (OS) (19%)[(15)79]. According to Graphic 1, the malpractice cases were divided into: 1) IR with 63,2 [(12)19]; OS with 21% [(4)19] and OT with 15,8%[(3)19] (Graphic 1).

The timeline procedure, 1) pre-operative, 2) intra-operative, and 3) post-operative was a criterion for dental practice categorisation. Implant rehabilitation malpractice was mainly related to the intra-operative task (92%), orthodontics to the intra-operative task (80%), followed by surgery to the post-operative task (84%) (graphic 2).

**Graphic 1.** Dental rehabilitation [orthodontic treatment (OT), implant rehabilitation (IR), and oral surgery (OS)] and sequel categorisation.



**Graphic 2.** It represents the correlation between dental rehabilitation type and the procedure's timeline. The dental rehabilitation types were orthodontic treatment (OT), implant rehabilitation (IR), and oral surgery (OS). The timeline of the rehabilitation procedure was pre-operative, intra-operative, and post-operative.



## DISCUSSION

As highlighted by Earwaker *et al.*, the legal decision making results from multiple interdependent issues with an emphasis on data sharing and data analysis<sup>21</sup>. According to this study, the community of health professionals can thus adapt and operate with the notion of risk inherent to the healthcare process. In dental malpractice and aesthetic context: Bordonaba-Leiva *et al.*<sup>13</sup>, present data from Spain; Sarmiento *et al.*<sup>12</sup> from the USA; Bordonaba-Leiva<sup>13</sup> and Badenoch-Jones<sup>14</sup> from Australia; Pinchi *et al.*<sup>15</sup> from Italy and no data has been published about Portugal.

Iatrogenic dental Portuguese data presented (73,8%)[79(107)], includes iatrogenic risk as complications of the procedure (76%)[60(79)] and clinical findings beyond good practice limits or malpractice (24,1%)[19(79)]. The malpractice data was (24,1%)[19(79)] in line with Bordonaba-Leiva<sup>13</sup> (15,8%).

Our clinical outcomes were categorised according to the sequelae of Portuguese damage assessment tables based on the European guidelines<sup>18-20</sup>. It enables future comparison since there is no uniformity in published studies that allow the correspondence and discussion of these results. The mandibular dysfunction was prevalent in 53,2% of iatrogenic sequelae, taking into account its characterisation (pain with limited mouth opening, temporomandibular dysfunction, maxillary atrophy and non-anatomical reduction of mandibular fractures). The neurological deficit with 39,2% was related to the asymmetry of lip commissures, hypoaesthesia, anaesthesia, paraesthesia or dysaesthesia (inferior dental or lingual nerve), taste alterations, absence of activity of masticatory muscles, and general facial asymmetry<sup>22</sup>. The incisors, canines, and premolars were the type of teeth lost (6,3%). Limitation of mouth opening was reported with 1,3%.

The orofacial neurological changes correspond to sensory or functional deficit and are relevant to the individual's self-esteem<sup>20</sup>, socio-professional interactions and, interpersonal relationships. Functions related to the inability to keep food or liquid in the oral cavity, unintentional tongue biting during chewing, difficulty speaking, alterations in phonation affect essential functions in a psychological and social context (e.g., breathing, chewing and communication)<sup>20,22</sup>. The damage assessment of these sequelae established

in the medico-legal scope links to the entire trigeminal nerve<sup>18,19</sup>. The mandibular dysfunctions were generally related to pain and degenerative condylar changes. Both sequelae can be associated with early facial ageing, facial asymmetry, and facial disharmony.

Dental risk is well known and classified according to their frequency and importance<sup>6-10,22</sup>. According to Pippi *et al.*<sup>22</sup>, the more invasive a procedure is, the more numerous and relevant the possible sequelae are. Long and complicated treatments could explain our results. A prolonged treatment allows a higher probability of failure in the interaction with the patient, and complex treatment requires a constant scientific update. Our data support that there are three major areas with significant expression in the field of expert evaluations and iatrogenic sequelae: orthodontic treatment (OT) (51,9%)(41)79, implant rehabilitation (IR) (29,1%)(23)79, and oral surgery (OS) (19%)(15)79. Facial asymmetry can be revealed as a frequent risk throughout orthodontic treatment<sup>9,23</sup>. In Thiesen *et al.*<sup>23</sup> study facial asymmetry might be concealed by dental compensations and it is related to longer treatment time. External apical root resorption (EARR) is another common pathological side-effect that leads to a permanent apical loss of root structure<sup>24,25</sup>. In most cases of mild EARR the normal function and lifetime of a tooth are unaffected, but in some cases of severe EARR, orthodontic treatment should be stopped, so as not to end in tooth loss [(3)19](graphic 1). We highlight that malpractice is mainly related to surgical staging (IR-63,2%; OS-19%), in line with Sarmiento *et al.*<sup>12</sup> study (55%) and Bordonaba-Leiva *et al.*<sup>13</sup> study. Pinchi *et al.*<sup>15</sup> study identified clinical findings in implant rehabilitation, ending with early or late implant loss. It highlights, as an example, nerve deficit, perforation of the maxillary sinus, pulpal dental necrosis, post-surgical complications and peri-implantitis, and total or partial loss of prosthetic rehabilitation. Oral surgery was related to a neurological deficit in line with Moore *et al.*<sup>5</sup> study.

According to the D'Cruz study<sup>6</sup> and the Portuguese Code of Ethics<sup>17</sup> we can highlight some general assumptions of incorrect practice or negligent procedure: the lack of scientific qualification to perform a medical act and the violation of guidelines of therapeutic activity, for non-compliance with ethics and medical

deontology. According to Sarmiento *et al.*<sup>12</sup> the lack of informed consent or coercion in the participation of therapy due to the economic interests of the health professional correspond to 23% of care where the error occurred. Pippi *et al.*<sup>22</sup> emphasise that the professional must inform the patient beforehand by providing a percentage of risk, preventable and non-preventable, before and after the surgery. The literature is consensual to considering the patient's expectations, adherence to clinical practice guidelines, and complete both verbal and written information, and communication before any treatment are essential for quality and safety of care in preventing malpractice.<sup>23</sup> Despite the guidelines and recommendations of the international scientific community,<sup>2-16,26</sup> the definition of acceptable performance standard does not exist. Therefore, the professional must act with expertise, prudence, and diligence, carrying out the risk management not only within the procedure itself but also before and after it<sup>22</sup>. The timeline procedure, 1) pre-operative, 2) intra-operative, and 3) post-operative was a criterion for dental malpractice categorisation (graphic 2). The intra-operative task was highlighted in implant rehabilitation (92%), in line with Pinchi *et al.*<sup>15</sup> study (82,6%), and orthodontic treatment (80%); followed by surgery in the post-operative task (84%). According to Pippi *et al.*<sup>22</sup> a defensive medicine must be implemented. The use of questionnaires for evaluation of patient risk factors as highlighted by Chandler-Gutiérrez *et al.*<sup>22</sup> Gava *et al.*,<sup>27</sup> highlighted the use of complementary diagnostic examinations as well for follow-up evaluation and monitoring. Failure at this task may explain the worst results during

the procedure in the areas of orthodontics and implantology. The worst results in the context of surgery are attributed to post-procedural follow-up and can be explained in light of the adherence of all elements involved<sup>26</sup>.

## CONCLUSIONS

This paper presents Portuguese medico-legal data in the field of dentistry. Risk and limits in dental practice reports as an iatrogenic sequel can be a malpractice procedure. It occurred in three significant areas of expertise: implantology, orthodontics, and surgery. Given the prevalence of malpractice, the need to assess its causes and recognise standards for its prevention is necessary.

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## AUTHOR CONTRIBUTIONS

A Corte-Real, Catarina Caetano, and Duarte Vieira conceived and designed the research. Catarina Caetano collected samples and data. Ana Corte-Real, Catarina Caetano, Salomão Rocha, Sónia Alves, André Dias Pereira, and Duarte Vieira analysed and interpreted the data. Ana Corte-Real and Duarte Vieira, also, draft the article and revisit critically for relevant intellectual content. All the authors wrote the paper, and they approve the final version to be published.

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