Diego Rafael Sena Gomes

Identificação humana por comparação entre tomografias *intra-vitae* e cortes ósseos *post-mortem*: relato de caso.

Brasília
2016

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Trabalho de Conclusão de Curso apresentado ao Departamento de Odontologia da Faculdade de Ciências da Saúde da Universidade de Brasília, como requisito parcial para a conclusão do curso de Graduação em Odontologia.

Orientador: Prof. Dr. Malthus Fonseca Galvão.

Brasília
2016

A toda minha família, que sempre esteve ao meu lado, me dando suporte e incentivo em minha vida.

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A Deus, por ter me dado saúde e força para superar as dificuldades.

Aos meus pais, que apesar das dificuldades, sempre fizeram de tudo para que eu tivesse um ensino de qualidade.

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À Polícia Civil do Distrito Federal, por ter cedido imagens, textos e laudos para que eu pudesse fazer meu trabalho de conclusão de curso.

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EPÍGRAFE

“Carpe Diem quer dizer colha o dia. Colha o dia como se fosse um fruto maduro que amanhã estará podre. A vida não pode ser economizada para amanhã. Acontece sempre no presente.”

Rubem Alves

RESUMO

GOMES, Diego Rafael Sena. Identificação humana por comparação entre tomografias *intra-vitae* e cortes ósseos *post-mortem*: relato de caso. 2016. Trabalho de Conclusão de Curso (Graduação em Odontologia) – Departamento de Odontologia da Faculdade de Ciências da Saúde da Universidade de Brasília.

A Odontologia Forense é especialidade odontológica que desempenha importante papel no dia a dia da população, principalmente por meio de perícias nos âmbitos cíveis e criminais, contribuindo com a aplicação da lei. Uma das áreas mais importantes é a identificação humana, que consiste em um processo científico, um conjunto de procedimentos de comparação de caracteres a individualizar uma pessoa. Alguns métodos podem ser empregados para determinação da identidade, são eles: antropológico, papiloscópico, odontológico e genético. Todos os métodos de identificação convencionais comparam coisas de mesma natureza. Neste trabalho, apresentamos comparações entre informações da mesma região anatômica, de distintas naturezas: tomografia computadorizada e cortes ósseos. O presente trabalho tem como objetivo principal demonstrar a utilização efetiva da técnica de comparação de tomografias *intra-vitae* com cortes ósseos *post-mortem* em caso concreto de identificação humana cadavérica. A partir da compatibilidade das imagens tomográficas *ante-mortem* e imagens fotográficas dos cortes ósseos transversais, *post-mortem*, ao nível do seio frontal, percebeu-se peculiaridades que proporcionaram a identificação positiva.

ABSTRACT

GOMES, Diego Rafael Sena. Human identification by comparing *intra-vitae* tomography and *post-mortem* bone cuts: case report. 2016. Undergraduate Course Final Monograph (Undergraduate Course in Dentistry) – Department of Dentistry, School of Health Sciences, University of Brasília.

Forensic dentistry is the dental specialty that plays an important role in the daily life of the population, mainly through expertise in civil and criminal areas, contributing to the implementation of the law. One of the most important areas is human identification, consisting of a scientific process, a set of character comparison procedures to distinguish one person. Some methods can be employed to determine the identity, they are: anthropological, fingerprinting, dental and genetic. All conventional identification methods compare things of the same nature. We present comparisons between information in the same anatomical region of distinct natures: computed tomography and bone cuts. This study aims to demonstrate the effective use of *intra-vitae* tomography comparison technique with bone cuts *post-mortem* in case of cadaveric human identification. From the compatibility of tomographic images *ante-mortem* and photographic images of cross bone cuts, *post-mortem*, the frontal sinus level was noticed peculiarities which provided positive identification.

SUMÁRIO

ARTIGO CIENTÍFICO

Este trabalho de Conclusão de Curso é baseado no artigo científico:

GOMES, Diego Rafael Sena. Identificação humana por comparação entre tomografias *intra-vitae* e cortes ósseos *post-mortem*: relato de caso.

Apresentado sob as normas de publicação da revista ***Forensic Science International.***

FOLHA DE TÍTULO

Identificação humana por comparação entre tomografias *intra-vitae* e cortes ósseos *post-mortem*: relato de caso.

Human identification by comparing *intra-vitae* tomography and *post-mortem* bone cuts: case report.

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RESUMO

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Resumo

A Odontologia Forense é especialidade odontológica que desempenha importante papel no dia a dia da população, principalmente por meio de perícias nos âmbitos cíveis e criminais, contribuindo com a aplicação da lei. Uma das áreas mais importantes é a identificação humana, que consiste em um processo científico, um conjunto de procedimentos de comparação de caracteres a individualizar uma pessoa. Alguns métodos podem ser empregados para determinação da identidade, são eles: antropológico, papiloscópico, odontológico e genético. Todos os métodos de identificação convencionais comparam coisas de mesma natureza. Neste trabalho, apresentamos comparações entre informações da mesma região anatômica, de distintas naturezas: tomografia computadorizada e cortes ósseos. O presente trabalho tem como objetivo principal demonstrar a utilização efetiva da técnica de comparação de tomografias *intra-vitae* com cortes ósseos *post-mortem* em caso concreto de identificação humana cadavérica. A partir da compatibilidade das imagens tomográficas *ante-mortem* e imagens fotográficas dos cortes ósseos transversais, *post-mortem*, ao nível do seio frontal, percebeu-se peculiaridades que proporcionaram a identificação positiva.

Palavras-chave: odontologia forense, identificação humana, tomografia computadorizada.

ABSTRACT

Human identification by comparing *intra-vitae* tomography and *post-mortem* bone cuts: case report.

Abstract

Forensic dentistry is the dental specialty that plays an important role in the daily life of the population, mainly through expertise in civil and criminal areas, contributing to the implementation of the law. One of the most important areas is human identification, consisting of a scientific process, a set of character comparison procedures to distinguish one person. Some methods can be employed to determine the identity, they are: anthropological, fingerprinting, dental and genetic. All conventional identification methods compare things of the same nature. We present comparisons between information in the same anatomical region of distinct natures: computed tomography and bone cuts. This study aims to demonstrate the effective use of *intra-vitae* tomography comparison technique with bone cuts *post-mortem* in case of cadaveric human identification. From the compatibility of tomographic images *ante-mortem* and photographic images of cross bone cuts, *post-mortem*, the frontal sinus level was noticed peculiarities which provided positive identification.

Keywords: forensic dentistry, human identification, computed tomography.

INTRODUÇÃO

A Odontologia Legal, sinônimo de Odontologia Forense, desempenha importante papel no dia a dia da população, principalmente por meio de perícias nos âmbitos cíveis e criminais, contribuindo para a aplicação da lei [1].

Uma das áreas mais importantes, aplicável em investigações forenses, é a identificação humana, graças às suas técnicas comparativas e reconstrutivas [2].

Identificação humana consiste em um processo científico, um conjunto de procedimentos de comparação de caracteres a individualizar uma pessoa [3].

Reconhecimento, por outro lado, é processo não científico praticado por familiares, amigos e conhecidos da vítima. Este processo sofre influências subjetivas e é sujeito às emoções, à memória e a interesses [4].

MÉTODOS DE IDENTIFICAÇÃO

O manual da *American Board of Forensic Odontology* - ABFO classifica a odontologia como método científico de identificação humana, além do reconhecimento visual, datiloscópico e DNA que também são classificados [5].

O *Disaster Victim Identification Guide*, da Interpol, também classifica a odontologia como sendo um método científico de identificação, apesar de classificar de forma diversa os métodos de identificação humana: a) identificação primária (análise datiloscópica, dentária e DNA) e b) secundária (descrições pessoais, achados médicos, roupas encontradas com as vítimas, entre outros) [6].

Existem inúmeros métodos de identificação humana, todos eles necessariamente comparativos, como: necropapiloscopia, genética, radiografia não odontológica, radiografia odontológica, modelos de gesso, fotografias odontológicas, fotografias casuais, marcas de mordida, fotografias e vídeos, inclusive sexuais, próteses numeradas, pegadas, fraturas antigas, análise de imagens tomográficas, entre outros.

A papiloscopia se apresenta como um método muito importante, pois, no Brasil, quase todas as pessoas são civilmente identificadas com suas impressões digitais, que são únicas para cada pessoa.

Uma simples microgota de fluido corporal carrega toda a bagagem genética do indivíduo, possibilitando uma identificação.

A sequência dos métodos leva em conta a disponibilidade da técnica, disponibilidade de informações *intra-vitae* e *post-mortem*. Além destes parâmetros, o tempo e o custo também são importantes fatores.

A título de ilustração, as figuras 1, 2 e 3 não se relacionam com o caso descrito no trabalho. São apenas figuras demonstrativas dos diferentes métodos de identificação humana.

Figura 1 – Radiografias periapicais *ante-mortem* e *post-mortem* posicionadas de forma similar.

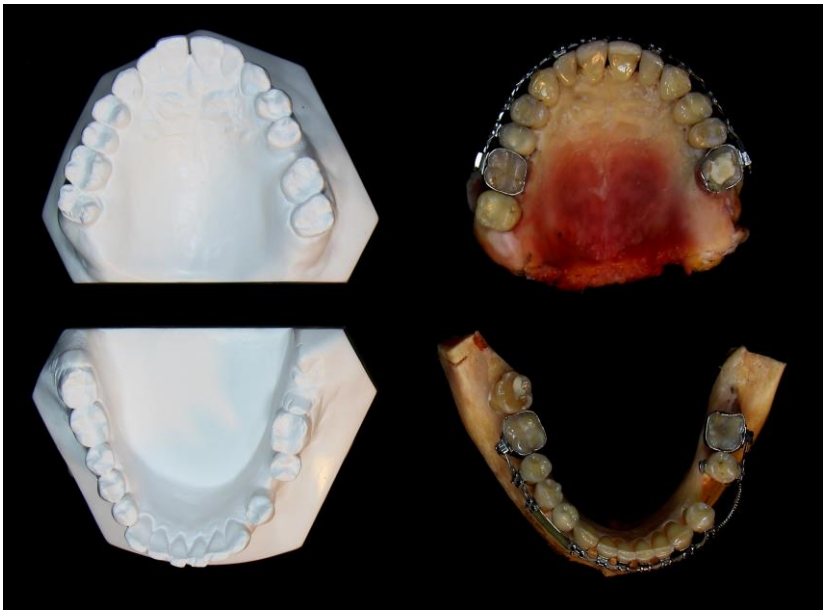

Figura 2 – Modelos de gesso *ante-mortem* e arco superior e inferior do cadáver.

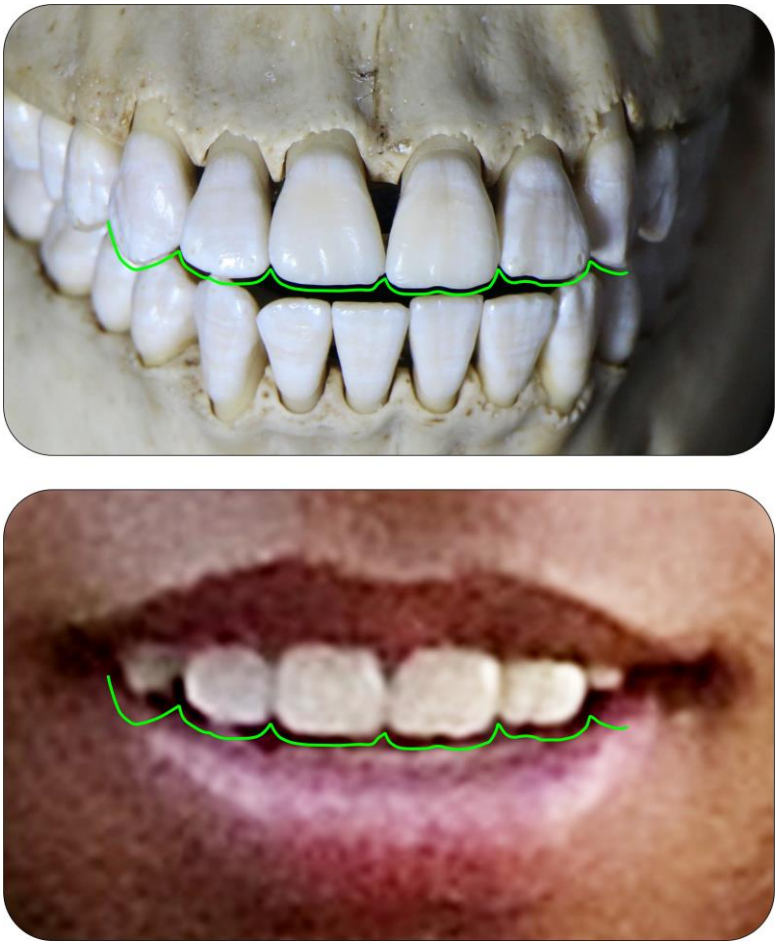

Figura 3 – Comparativo da linha do sorriso.

Na genética, assim como na papiloscopia, os registros são praticamente imutáveis, entretanto, na odontologia, quando se comparam dentes ou estruturas ósseas, sempre devemos levar em conta a possibilidade de alterações ao longo do tempo.

O princípio da imutabilidade diz: “os elementos devem permanecer idênticos a partir do momento em que se constituem” [7]. Tal princípio é muito relativo para a odontologia, pois no decorrer do tempo os dentes e as estruturas ósseas podem sofrer modificações naturais de crescimento ou traumas, por exemplo, que poderão alterar sua estrutura.

Todas as técnicas convencionais comparam coisas de mesma natureza. Neste trabalho, apresentamos comparações entre informações da mesma região anatômica de distintas naturezas. Tal região, seio frontal, sofre transformações naturais no decorrer do tempo, advindas do crescimento. Porém tais transformações são em espessura e tamanho, a forma é praticamente a mesma, corroborando em parte com o princípio de identificação da imutabilidade.

TOMOGRAFIA COMPUTADORIZADA (TC)

Tomografia computadorizada é um mecanismo de aquisição volumétrica de imagens, ou seja, permite obter imagens tridimensionais, eliminando a sobreposição de estruturas anatômicas, bem como diferenciar tecidos moles e estruturas ósseas [8]. Nesse contexto, a utilização de TC é de grande importância para a odontologia forense, pois facilita a identificação humana.

Existem diferenças entre as tomografias utilizadas na odontologia e na medicina. A odontologia utiliza a TCFC (feixe cônico), e a medicina utiliza, em geral, a TC espiral. Tais diferenças decorrem das trajetórias espaciais dos feixes de raios X [9].

A TCFC, em relação à TC espiral, é realizada por aparelhos menores e de maior facilidade no manuseio, com tempo de escaneamento reduzido e dose de radiação para obtenção da imagem muito menor [9].

Em relação à aquisição da imagem, na TCFC a imagem do crânio é formada como um todo pelo tomógrafo, e é o programa do computador que realiza os cortes da imagem. Já na TC espiral, a imagem do crânio é adquirida em fatias e o computador fica com a função de uni-las para a obtenção da imagem como um todo [8].

A tomografia computadorizada tem a vantagem de fornecer imagem segmentada, de adquirir imagens no plano axial ou coronal [10], o que é fundamental na aplicação da técnica de comparação com os cortes ósseos. A TC permite a obtenção de dimensões lineares, angulares e volumétricas [11]. Figura 4.

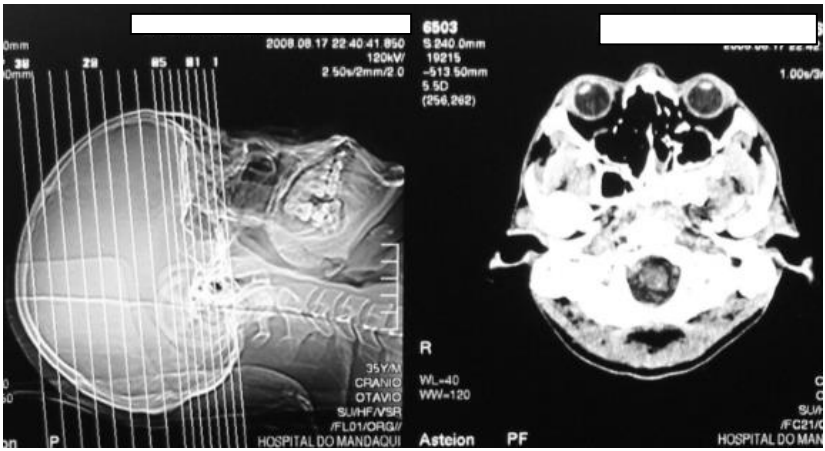

Figura 4 - Aquisição da imagem tomográfica e corte axial do crânio.

Outras vantagens da TC são acurácia geométrica, a possibilidade de isolar regiões anatômicas, a capacidade de desarticular imagens na tela do computador e de produzir modelos em 3D. Todos esses recursos são imprescindíveis e simplificam a apresentação de evidências em procedimentos de avaliação e jurídicos [10].

Esta abordagem virtual em 3D é uma ponte entre os métodos tradicionais de identificação e as técnicas de imagens craniofaciais modernas, promovendo alta qualidade e confiabilidade [10].

Janela, ou o janelamento, é a exibição seletiva de uma faixa de tons de cinza específica, de forma a permitir a visualização seletiva por densidades dos dados obtidos pelo tomógrafo, conforme a necessidade [8]. São recursos computacionais que, mesmo após a obtenção das imagens, permitem que a escala de cinzas seja estreitada ou alargada, permitindo e facilitando a diferenciação das estruturas.

Um arquivo de uma tomografia é muito mais que um conjunto de imagens, é uma nuvem de pontos que nos permite realizar “cortes” em qualquer direção e alterar a janela.

A reconstrução em 3D, obtida através da técnica de volume, permite um melhor arquivamento dos dados, facilitando sua análise. Em Odontologia Forense, isso se reflete numa melhor visualização dos pontos antropométricos. Além disso, é possivel, rapidamente, trabalhar na imagem com movimentos de rotação e translação, alterar zoom, ou até segmentar áreas que não estão sendo estudadas ou que impeçam a visualização do local de interesse. Esse tipo de reconstrução torna a identificação mais fácil e direta [10].

CORTE ÓSSEO

Esta técnica nasceu da observação dos cortes naturalmente realizados no crânio, para necropsias em geral, nas quais, muitas vezes o plano de corte Griesinger passava por regiões do seio frontal e era possível visualizar suas peculiaridades. Corte de Griesinger é uma técnica de corte transversal do crânio, que segue o plano horizontal, a cerca de dois centímetros acima da glabela [12].

O método de identificação humana por comparação de imagens tomográficas *intra-vitae* com cortes ósseos *post-mortem* é utilizado em decorrência de ser simples, prático, de baixo custo e, principalmente, pela atual inexistência de um tomógrafo no IML do Distrito Federal.

Para fazer o corte no osso se utiliza serrote, serra elétrica oscilatória ou lixadeiras. Os dois primeiros para fazer o corte propriamente dito no crânio, sendo a serra elétrica vantajosa, pois possui lâmina oscilatória de alto desempenho, que promove cortes finos e precisos. As lixadeiras fazem o acabamento dos cortes, opcional. E obtém-se a imagem fotográfica para posterior comparação.

OBJETIVO

O presente estudo tem como objetivo principal demonstrar a utilização efetiva da técnica de comparação de tomografias *intra-vitae* com cortes ósseos *post-mortem* em caso concreto de identificação humana cadavérica.

DESCRIÇÃO DO CASO

Um adulto do sexo masculino, com idade à época de 40 anos, foi encontrado morto em um matagal no SGAN (Setor de Grandes Áreas Norte), próximo ao SLU (Serviço de Limpeza Urbana), Asa Norte. O cadáver trajava blusa branca, bermuda vermelha e estava em avançado estado de mumificação, inviabilizando o reconhecimento, conforme figura 5.

Figura 5 – Aspecto do cadáver ao ser encontrado. Fotografia da Perita Maité Cevallos Mijan da PCDF.

Os familiares acionaram a delegacia e registraram o desaparecimento da vítima. A irmã da vítima referiu que seu irmão sofrera um atropelamento há cerca de cinco anos em São Paulo e que, após internação, sofria convulsões. A irmã apresentou diversas radiografias e tomografias à época do atropelamento. Todas disponíveis em películas, ou seja, sem o arquivo digital correspondente. Figura 6.

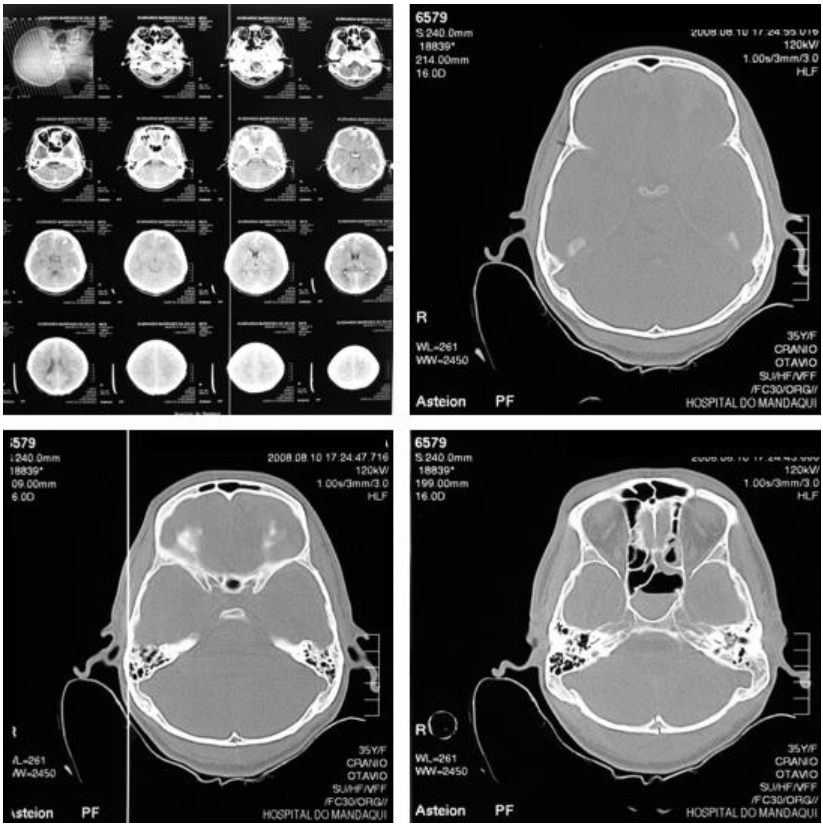

Figura 6 – Tomografias em película fornecidas pela irmã da vítima.

No crânio foram observados sinais de fraturas ósseas, que com muita probabilidade, foram causadas em tempos diversos e há alguns anos, pois havia vários sinais de remodelação óssea, que indicam a temporalidade, não específica, do trauma. Figura 7.

Figura 7 – Fraturas cranianas após remodelação óssea.

Tendo em vista a fase putrefativa em que o cadáver foi encontrado, no intuito de se descobrir a causa da morte, o único caminho era o preparo físico-químico do corpo, reduzindo-o à ossada. Figura 8.

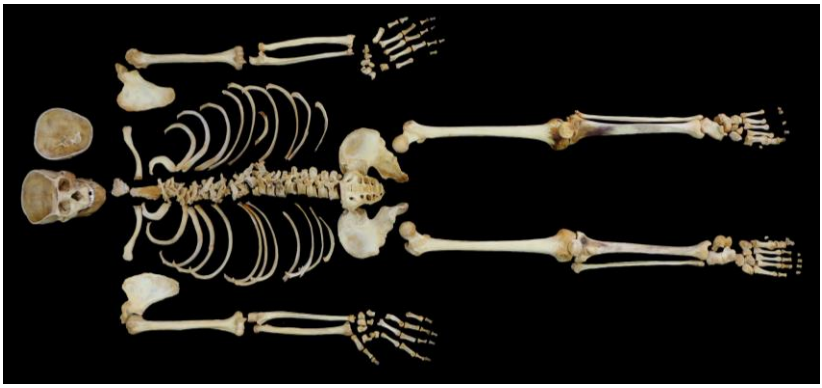

Figura 8 – Esqueleto completo após o preparo.

Ao final da análise da ossada e da análise entomológica, que é o estudo dos insetos e larvas necrofágicas, a possibilitar a

cronotanatognose, feita pela equipe de Entomologia da Universidade de Brasília, concluiu-se que o óbito antecedeu aproximadamente em um mês a data do encontro dos restos mortais.

A *causa mortis* foi indeterminada, por falta de vestígios relacionáveis à morte. Uma hipótese consistente é que alguma causa imediata decorrente dos traumas e convulsões tenha ocorrido.

O cadáver foi identificado pela confirmação de coincidências nas imagens fotográficas em cortes transversais do crânio na região dos seios frontais em comparação com as imagens tomográficas *intra-vitae* da mesma região. A papiloscopia também identificou a vítima, o que corroborou a técnica empregada. Figura 9.

Figura 9 – Polpa digital do quarto quirodáctilo direito (relativo à identificação necropapiloscópica).

DISCUSSÃO

A análise dos seios frontais já é bem estabelecida quanto ao processo de identificação humana, pois eles preenchem os princípios da identificação [13]: são únicos para cada indivíduo, são imutáveis de forma parcial, pois sofrem transformações naturais de espessura e tamanho ao longo do tempo e são perenes, tendo em vista que só não resistem à ação do tempo caso haja algum tipo de fratura, trauma ou doença.

Tendo em vista que o IML-DF ainda não dispõe de um tomógrafo para a obtenção de imagens tomográficas, foi realizada uma "tomografia" de forma direta, por diversos cortes horizontais, orientados pelo plano de Frankfurt, sequenciais ao nível do seio frontal com espessura de corte de aproximadamente um milímetro para cima e para baixo [12].

Tendo em vista a espessura da lâmina do serrote em relação à distância entre os cortes, não se obtinha uma lâmina óssea a cada corte, mas sim a estrutura removida reduzia-se a pó de osso.

A cada corte, a superfície do mesmo era preparada, devidamente posicionada e fotografada para posterior comparação com os cortes das imagens tomográficas. Figura 10.

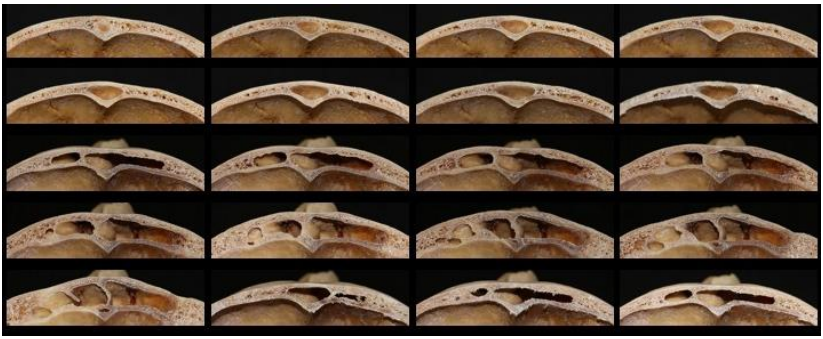

Figura 10 – Seios frontais em cortes horizontais sequenciais.

A montagem destas imagens levou não só ao alinhamento como também à dimensão, obtida por meio de uma escala métrica incluída nas fotografias. Figura 11.

Figura 11 – Vista axial dos seios frontais com escala métrica.

Com as imagens tomográficas *intra-vitae* e as imagens fotográficas dos seios frontais *post-mortem*, foi possível fazer a comparação e determinar a identificação como positiva.

A coincidência entre caracteres disponíveis nas documentações odontológicas com os vestígios cadavéricos dispensa a realização de outros exames como genéticos ou papiloscópicos.

Também fica desnecessária a entrevista com familiares, emocionalmente abalados. Além do grande número de convergências não foi encontrada nenhuma divergência excludente. Figura 12.

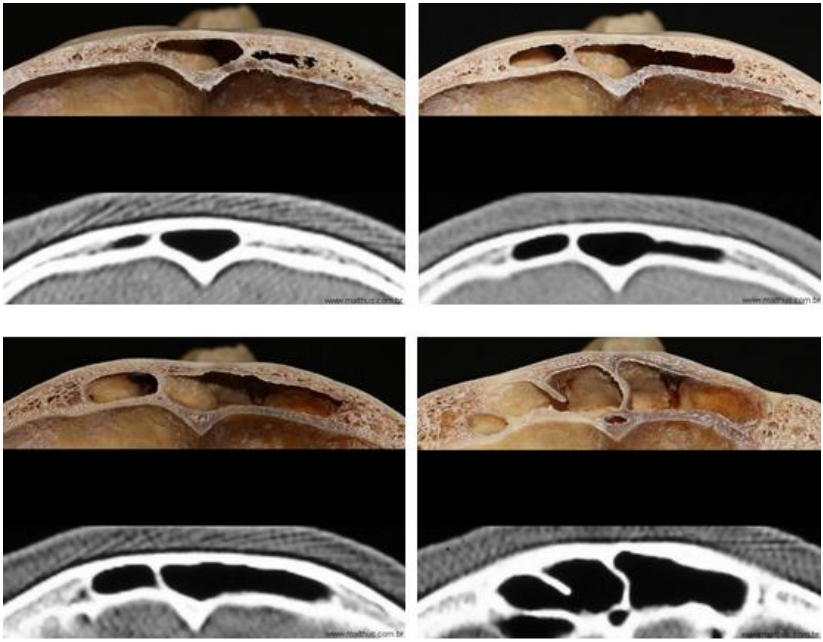

Figura 12 – Comparação entre imagem fotográfica e tomográfica dos seios frontais. Vista axial.

Tal qual a impressão digital, os caracteres genéticos e odontológicos, os seios frontais apresentam variabilidade grande em forma, tamanho, septos e disposição tridimensional.

A título de ilustração, a figura 13 não se relaciona com o caso descrito no trabalho. É apenas uma imagem que mostra a variabilidade dos seios frontais.

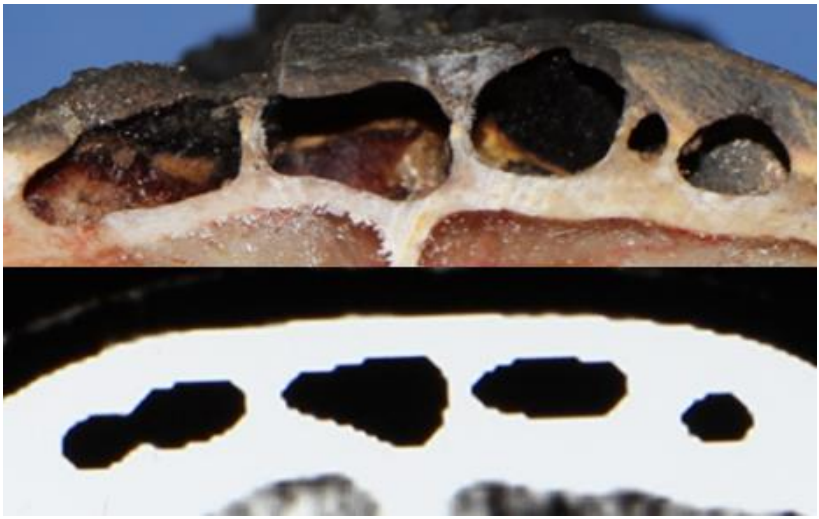

Figura 13 – Imagem meramente ilustrativa que não se relaciona com o caso descrito no trabalho. Mostra a variabilidade dos seios frontais.

CONSIDERAÇÕES FINAIS

A utilização da técnica de comparação de tomografias *intra-vitae* com cortes ósseos *post-mortem* muito contribui para o processo de identificação humana, pois é um método científico simples, de baixo custo, eficiente e substitui com excelência a ausência do tomógrafo. Além de conseguir estabelecer a identidade do indivíduo no caso descrito no trabalho.

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[4] Cancer Research UK, Cancer statistics reports for the UK. http://www.cancerresearchuk.org/aboutcancer/statistics/cancerstatsreport/, 2003 (accessed 13.03.03).

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