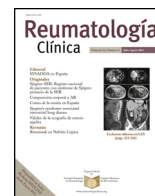




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Original Article

Radiographic Changes of the Distal Phalanx Tuft of the Hands in Subjects With Systemic Sclerosis. Systematic Review[☆]

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ABSTRACT

Objective: To determine abnormal plain radiograph findings of the distal phalanx tuft of the hand (DPTH) associated with systemic sclerosis in adults.

Methods: A systematic review was developed following the parameters of the PRISMA guidelines in databases: MEDLINE, EMBASE, BIREME, Scielo, Google Scholar and others including as primary outcomes alterations of DPTH (erosions, resorption, sclerosis and proliferation) detected by simple radiography in subjects with systemic sclerosis. The prevalence of radiographic findings was synthesized using the fixed effects model. The statistical associations were expressed in terms of relative risk or odds ratio with their respective confidence intervals and *p* values.

Results: Twenty-two observational studies were included; the prevalence of DPTH resorption was 28.3% (95% CI: 0.256–0.312; *p* < .001); *I*² = 80.4%, the prevalence of calcinosis was 15.6% (95% CI: 0.113–0.210; *p* < .001); *I*² = 0%. No study reported proliferation or erosions and only one study described sclerosis of DPTH in 5 individuals.

Conclusions: Resorption and calcinosis of DPTH are the characteristic radiographic findings in patients with systemic sclerosis. However, new studies with greater methodological strength are needed to establish associations between these phenomena and their presence in other connective tissue diseases.

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Cambios radiográficos del penacho de la falange distal de las manos en pacientes con esclerosis sistémica. Revisión sistemática

RESUMEN

Objetivo: Determinar en radiografía simple los hallazgos anormales del penacho de la falange distal de los dedos de la mano (PFDM) asociados a la esclerosis sistémica (ES) en adultos.

Métodos: Se desarrolló una revisión sistemática siguiendo los parámetros de las guías PRISMA en las bases de datos: MEDLINE, EMBASE, BIREME, Scielo, Google Scholar entre otras incluyendo como resultados primarios las alteraciones del PFDM (erosiones, resorción, esclerosis y proliferación) detectadas por radiografía simple en sujetos con ES. La prevalencia de los hallazgos radiográficos fue sintetizada usando el modelo de efectos fijos. Las asociaciones estadísticas (según el tipo de estudio) se expresaron en términos de riesgo relativo u odds ratio con sus respectivos intervalos de confianza y valores *p*.

Resultados: Veintidós estudios observacionales fueron incluidos, la prevalencia de resorción del PFDM fue de 28,3% (IC 95%: 0,256–0,312; *p* < 0,001) y un valor *I*² = 80,4%, la prevalencia de calcinosis fue de 15,6% (IC 95%: 0,113–0,210; *p* < 0,001) y un valor *I*² = 0%. Ningún estudio reportó proliferación o erosiones y solo un estudio describió esclerosis del PFDM en 5 pacientes.

Palabras clave:

Esclerosis sistémica
Radiografía
Falanges de los dedos
Manos

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Conclusiones: La resorción y calcinosis del PFDM son los hallazgos radiográficos característicos en pacientes con ES, sin embargo hacen falta estudios con una mayor solidez metodológica que permitan establecer con certeza las asociaciones entre estos fenómenos y la presencia de otras enfermedades del tejido conectivo.

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Introduction

Systemic sclerosis (SSc) is the result of a combination of autoimmune and vascular phenomena in association with fibrosis that triggers changes in the skin, soft tissue, joints and bones.¹ It mostly affects women and has a variable clinical course. It is a rapidly progressive condition and, in some cases, has a high risk of mortality.

An early manifestation of SSc is the involvement of the hands,² which occurs in between 46% and 97% of the cases.³ Despite the low sensitivity and specificity for the detection of early disease-related changes,⁴ plain radiography of the hands is useful for the follow-up of patients, with calcinosis and acro-osteolysis being the characteristic radiographic findings.^{5,6}

The term acro-osteolysis refers to the resorption of the terminal digital tufts.⁷ We should point out that the distal phalangeal tuft does not have a universal radiographic definition. However, it can be considered the region of the distal phalanx in which the cortical bone changes and, rather than being completely smooth, acquires a tapered aspect⁸ (Fig. 1).

The radiographic changes in the phalangeal tuft of the fingers (PTF) in patients with SSc is not exclusive to that disorder. Acro-osteolysis has also been described in individuals with mixed connective tissue diseases (MCTD).^{6,9} On the other hand, in 1929, Edeiken¹⁰ reported 3 cases of SSc with sclerosis of the distal phalanx, a finding that was subsequently characterized in patients with rheumatoid arthritis (RA).¹¹

As a outcome of the discrepancy between evidence concerning the radiological involvement of PTF in musculoskeletal diseases, the

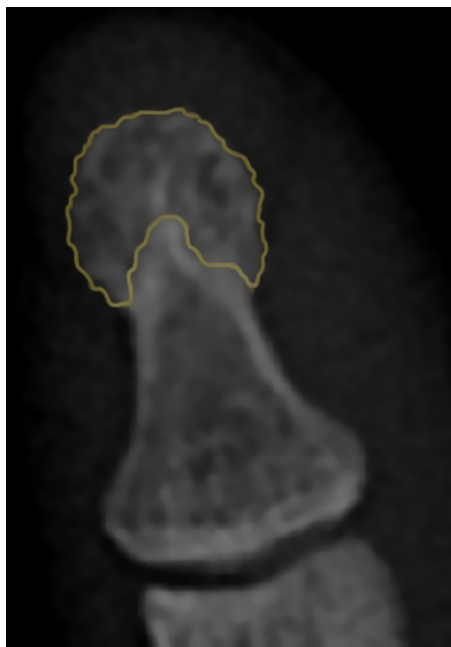


Fig. 1. Radiographic image of the normal tuft. The orange-colored region delineates the area corresponding to the PTF. It indicates the typical tapering aspect of the cortical bone. The coloring appears only in the online version of the journal.

description of these structures is overlooked in the interpretation of a plain radiograph of the hands in clinical practice.

The objective of this review is to establish the abnormal findings in the PTF observed in plain radiographs in adults with SSc.

Methods

This review was carried out following the parameters of the PRISMA guidelines.¹² The protocol was registered (registration no. CRD42015025185) in the PROSPERO database of systematic reviews of the University of York, which can be consulted in the following link: http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015025185.

Search Strategy and Eligibility

Search Method for Identifying Potential Studies

- We conducted a systematic search up to December 2015, with no restrictions on language or publication date, in the following databases: MEDLINE, EMBASE, BIREME (*Biblioteca Regional de Medicina*), LILACS (*Literatura Latinoamericana y del Caribe en Ciencias de la Salud*), SciELO, EBMR (Evidence-Based Medicine Reviews), Cochrane Central Register of Controlled Trials, Clinical Trials and Google Scholar.
- The search in MEDLINE was carried out via PubMed, utilizing the MeSH terms “Scleroderma, Systemic”, “Finger Phalanges” and “Radiography”, linking them with the Boolean operator AND. To increase the sensitivity of the search, we aggregated the respective entry terms for each MeSH term, linking them with the Boolean operator OR.
- Given that PTF has no MeSH equivalent, an additional search was performed replacing the MeSH term “Finger Phalanges” by the words “tuft OR plume”.
- The search strategy employed in MEDLINE was adapted for BIREME, using the respective DeSC terms “Descriptores en Ciencias de la Salud [Health Sciences Descriptors]”, and for the other databases, we used the equivalent MeSH-DeSC keywords mentioned above. The complete set of search terms can be found in the supplemental material corresponding to the protocol registered in the PROSPERO platform.

Screening the Studies

- Once duplicates had been excluded, 2 authors (LMC and SVG) who were not experts in radiology or rheumatology evaluated the potential articles. Those documents included had at least 1 of the following words in the title or abstract: “erosion”, “resorption”, “sclerosis” or “proliferation” (which were translated to the original language of the publication). Any disagreement was resolved by consensus with a third author (YEI).

Inclusion Criteria

- (1) Type of study: case report, case-control, cross-sectional or cohort study and randomized or nonrandomized clinical trial.

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