

The Collagen Fibers Analysis of the Odontogenic Cysts: A Study with Picrosirius Red Staining Under Polarizing Microscopy

Chatchaphan Udompatanakorn¹, Sorasun Rungsiyanont¹

¹Department of Oral Surgery and Oral Medicine, Faculty of Dentistry, Srinakharinwirot University, Thailand

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Corresponding Author: Dr. Chatchaphan Udompatanakorn, Department of Oral Surgery and Oral Medicine, Faculty of Dentistry, Srinakharinwirot University, Bangkok 10110 Thailand. (E-mail: chatchaphanudom@yahoo.com)

Abstract

Objectives: This study aims to compare the polarization colors of the collagen fibers in the connective tissue wall (CNT) of radicular cyst (RC), dentigerous cyst (DC), odontogenic keratocyst (OKC), and calcifying odontogenic cyst (COC).

Methods: Collagen in the CNT of ten patients diagnosed with RC, DC, OKC, or COC was stained with picrosirius red staining and examined under a polarizing microscope. The birefringence of collagen fibers of odontogenic cysts (OCs) regarding the frequency and the labeling index (LI) scores based on the proportion of mature collagen (orange-red fibers) and immature collagen (greenish-yellow fibers) were compared.

Results: The orange-red polarization color was observed predominantly in the CNT of DCs (90.0%), RCs (70.0%), and OKCs (60.0%). Meanwhile, the greenish-yellow polarization color predominated in the CNT of COCs samples (50.0%). The mean LI values of RCs, DCs, OKCs, and COCs were 1.93 ± 0.73 , 1.90 ± 0.44 , 2.03 ± 0.93 , and 1.40 ± 0.59 , respectively. There is no statistically significant difference between the groups ($p > 0.05$).

Conclusions: Although no statistically significant difference between OCs was observed, the collagen fibers of COCs were different from other OCs. The greenish-yellow polarization color predominantly observed in COCs suggested that the CNTs of some COCs might play a role in the cystic neoplasm behavior.

Keywords: collagen, odontogenic cyst, picrosirius red staining, polarizing microscopy

Introduction

Odontogenic cysts (OCs) are a heterogeneous group of diseases derived from the epithelial and remnant cells of tooth-forming apparatus.⁽¹⁾ They are classified into two groups including inflammatory cyst and developmental cyst.⁽¹⁾ OCs comprise three parts: lumen, epithelial-lined lumen, and surrounded fibrous connective tissue wall (CNT). About 7.0-12.0% of all biopsies from oral and maxillofacial region have been diagnosed with OCs including radicular cysts (RCs), dentigerous cysts (DCs), odontogenic keratocysts (OKCs), and calcifying odonto-

genic cysts (COCs).^(1,2) RCs are inflammatory in origin and are associated with non-vital teeth. DCs are attached to cemento-enamel junction of unerupted teeth.^(2,3) OKCs are developmental cysts. They are characterized by locally aggressive behavior and tendency to recur in case of incomplete removal or in the presence of satellite cysts.^(2,4) COCs show variable clinical behavior. Some of them show recurrence.^(2,5) The most common cyst of the jaws is RCs (55.0%), followed by DCs (about 20.0%), OKCs (about 10.0%), and COCs (< 1.0%), respectively.^(2,3)

The epithelial lining of such OCs has been exten-