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## Minimally invasive ultrasound-guided parotid gland biopsy in cadavers performed by rheumatologists

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### Keywords

ultrasound,  
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### Abstract

**Introduction:** Surgical biopsy of minor salivary glands is routinely performed for the diagnosis of Sjögren syndrome. However, surgical biopsies of the minor labial glands may result in various complications in up to 6% of patients. On the other hand, adverse events following core needle biopsies of the parotid gland in non-rheumatological settings have been reported as very rare. **Aim:** The objective of this study was to assess the feasibility and determine the presence of parotid gland tissue in ultrasound-guided parotid gland biopsies performed by rheumatologists in cadavers. **Material and method:** Two senior rheumatologists obtained, under direct ultrasound visualization in in-plane technique, biopsies of 8 parotid glands from 4 different cadavers using a core biopsy needle. One biopsy per gland was taken. **Results:** All histological exams showed typical parotid gland tissue without any neuronal or vascular tissue. **Conclusion:** In conclusion, we demonstrated that minimally invasive, ultrasound-guided core needle biopsy of the parotid gland is a highly precise and easy method to obtain salivary gland tissue.

## Introduction

The diagnosis of Sjögren syndrome (SS) is frequently made after surgical biopsy of minor salivary glands. The 2016 ACR/EULAR classification criteria<sup>(1)</sup> for SS include specific histological findings in salivary gland tissue: a focus score (number of infiltrates of 50 or more mononuclear inflammatory cells – predominantly lymphocytes – in a perivascular or periductal location) of at least one per 4 mm<sup>2</sup> labial

salivary gland tissue<sup>(2)</sup>. Surgical biopsies of the minor labial and parotid glands need a certain degree of surgical experience and are associated with various complications. Labial and parotid glandular tissue have comparable diagnostic potential<sup>(3)</sup>, and adverse events following core needle biopsies of parotid gland masses in non-rheumatological settings are very rare<sup>(4)</sup>. The development of ultrasonography to diagnose and evaluate salivary glands – especially parotid and submandibular glands – is emerging<sup>(5)</sup>. As ultrasonography of the minor labial glands and biopsy

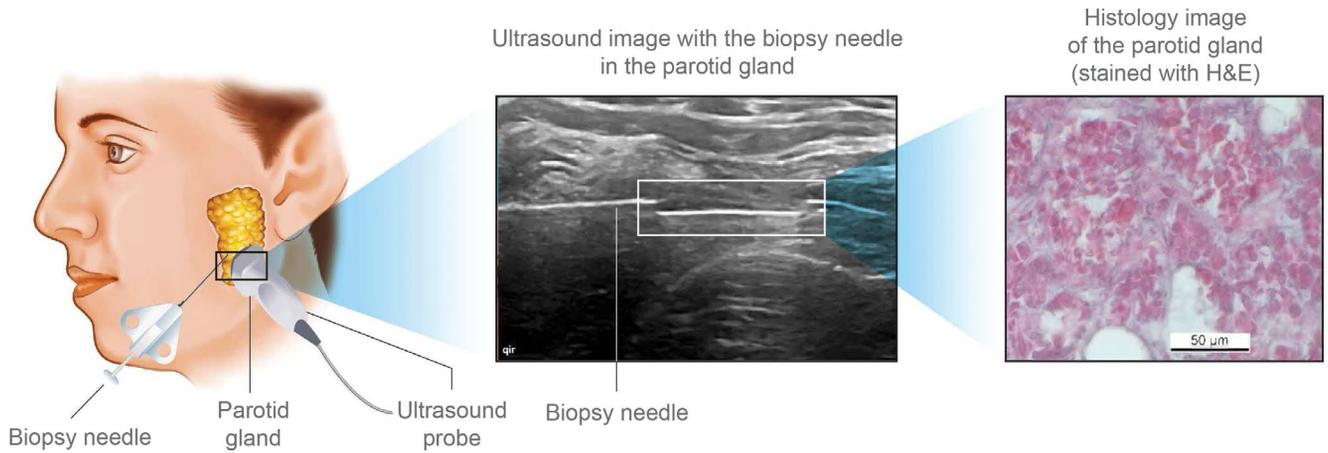


Fig. 1. Ultrasound-guided parotid gland biopsy. H&E = Hematoxylin and eosin

of the submandibular glands are limited, a comparison of sonographic and histological results is only possible for the parotid gland.

## Aim

The aim of this study was twofold: to assess the feasibility of minimally invasive ultrasound-guided parotid gland biopsies performed by rheumatologists in cadavers and to determine the presence of parotid gland tissue in the taken samples.

## Material and method

Two senior rheumatologists and trained sonographers (GT and CM) obtained, under direct ultrasound visualization using in-plane technique, biopsies of 8 parotid glands from 4 different cadavers (each rheumatologist 4) with a core biopsy needle (Quick core biopsy needle 18G with 10 mm throw length). Only one biopsy shot per gland was performed; the possibility existed that no tissue would have been acquired. The biopsy setting and the transcutaneous procedure are shown in Fig. 1. The samples underwent histological examination by an experienced pathologist (UW).

## Results

All 8 samples obtained by minimally invasive ultrasound-guided biopsy showed typical parotid gland tissue without any neuronal or vascular tissue.

## Discussion

In surgical labial gland biopsies, complications occur in about 6–10% of cases and vary from localized, often permanent, sensory numbness of the lip, external hematoma, local swelling, formation of granulomas, internal

scarring and cheloid formation, failing sutures to local pain<sup>(6)</sup>. However, in a meta-analysis with 1,315 patients who underwent ultrasound-guided core needle biopsy of salivary glands (83% parotid gland biopsies), there was only one case of facial weakness due to local anesthesia of the facial nerve and only seven cases of local hematoma<sup>(5)</sup>. These results suggest a superior tolerance of ultrasound-guided core needle biopsy in comparison to surgical biopsy.

Apart from being of diagnostic value, parotid gland biopsies may also play a role in predicting lymphoma development in SS<sup>(7)</sup> and could be of value in monitoring disease activity and treatment efficacy in SS, especially as repeated biopsies from the same parotid gland are possible<sup>(8–10)</sup>.

As this was a cadaveric study, the feasibility and complications of ultrasound-guided core needle biopsies of the parotid gland done by rheumatologists in SS patients need to be established in real life and in larger case series. In addition, the histological interpretation has to be standardized as done for labial salivary gland biopsy<sup>(11)</sup>.

## Conclusion

In conclusion, based on all the above-mentioned facts and this study, ultrasound-guided core needle biopsies of the parotid gland, which can easily be performed by rheumatologists, could be a promising tool to diagnose, evaluate the activity, and monitor treatment effects in SS.

## Conflict of interest

Authors do not report any financial or personal connections with other persons or organizations, which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

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