for 13% of cases (Werning 1991). Submandibular gland enlargement may occur in the absence of parotid swelling, with or without clinical evidence of minor salivary gland involvement (Figure 6.12). Minor salivary gland involvement is occasionally noted histologically in the presence of clinically apparent major salivary gland swelling (Mandel and Kaynar 1994). In fact, enlargement of the major salivary glands may be the first identifiable sign of sarcoidosis (Fatahzadeh and Rinaggio 2006). When this occurs, therefore, it is important to differentiate the parotid swelling associated with sarcoidosis from that of Sjogren's syndrome (Folwaczny et al. 2002). Salivary gland biopsy with histopathologic examination is one means to make this distinction.

DIAGNOSIS OF SARCOIDOSIS WITH SALIVARY GLAND BIOPSY

As with Sjogren's syndrome diagnoses with salivary gland biopsies, early stage disease is perhaps more readily diagnosed with a parotid biopsy rather than a minor salivary gland biopsy. It has been pointed out that cases of sarcoidosis that do not clinically produce parotid enlargement nonetheless show involvement at the microscopic level (Marx 1995). In this review, the labial biopsy was positive in 38% of cases while 88% of parotid biopsies were positive for sarcoidosis. The lesions of sarcoidosis in labial salivary gland biopsies tend to be sparse such that multiple labial glands require excision for microscopic analysis. Another report investigated the yield of minor salivary gland biopsy in the diagnosis of sarcoidosis (Nessan and Jacoway 1979). In this study of 75 patients, non-caseating granulomas were present in minor salivary gland biopsies in 44 patients (58%). There was no correlation with minor salivary gland biopsy yield and stage of the disease. The highest yield for diagnosis of sarcoidosis was found in transbronchial lung biopsies (93%). Nonetheless, the diagnosis of sarcoidosis is one of exclusion, owing to an absence of a diagnostic gold standard. As such, a compatible clinical picture is established based on the patient's symptoms, physical, and radiographic findings. The biopsy of salivary gland tissue or other tissue identifies the presence of non-caseating granulomas such that a provisional diagnosis of sarcoidosis is made. It then becomes necessary to exclude other sources of granulomatous inflammation, such as Crohn's disease, deep fungal infections, and others. It is important to point out that there are no pathognomonic diagnostic tests for sarcoidosis. Rather, the salivary biopsy must be considered with an elevated angiotensin converting enzyme (ACE) and lysozyme result, and an altered ratio of CD4/CD8 cells, among others, so as to offer a diagnosis of sarcoidosis (Kasamatsu et al. 2007).

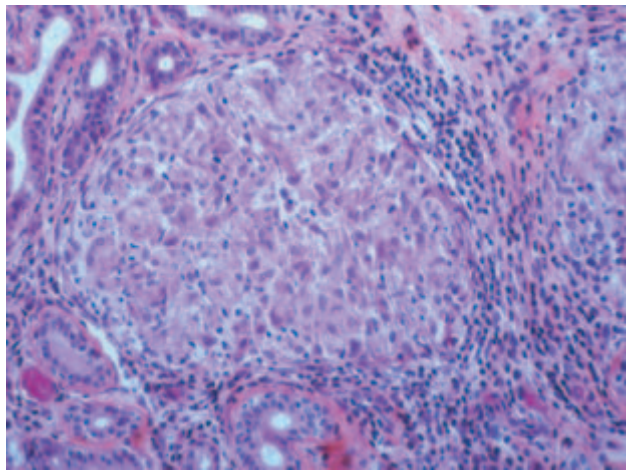

Figure 6.13. Histopathology of sarcoidosis. (Image courtesy of Dr. Joseph A. Regezi.)

Histopathology of Sarcoidosis

Numerous granulomas may be seen in the salivary gland biopsy. The typical sarcoid granuloma is non-caseating and consists of a tightly packed central focus of histiocytes that is surrounded by lymphocytes and fibroblasts at its periphery (Figure 6.13). The histiocytes may be epithelioid and may join to form multinucleated giant cells, frequently of the Langhans type.

Sialosis

Sialosis, also known as sialadenosis, represents a bilateral enlargement of the parotid gland that is multifactorial in its etiology (Table 6.3). It is not commonly associated with an autoimmune phenomenon, as is the case for Sjogren's syndrome and sarcoidosis, although it can easily be confused with these two pathologic processes due to its clinical presentation (Figure 6.14). Quite commonly, sialosis is caused by nutritional disturbances such as alcoholism, bulimia, or in the rare case of achalasia (Figure 6.15). Chronic alcoholism with or without