

Dental Crown Restorations on a Snow Leopard

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Introduction

In the spring of 1983 the San Francisco Zoo received a female snow leopard (*Panthera uncia*) as part of an exotic animal exchange program with the People's Republic of China. Upon examination, it was found that this nine-year old, seventy-five pound, wild-trapped animal had sustained considerable dental injuries, including fractures of all maxillary and mandibular anterior teeth. The purpose of this paper is to describe the dental procedures undertaken to restore the physiological function of all four canines.

Diagnosis and Surgery Plan

The maxillary and mandibular central incisors and the four canines had been fractured horizontally. All central and lateral incisors were fractured at the approximate level of the alveolar bone; gingival tissue had grown aggressively over the remaining root structures. There was no sign of pulpal necrosis. Upon x-ray it was apparent that the vital pulp tissue was attached to the surrounding alveolar tissue both at the apex and the coronal end. Consequently a normal healthy environment of the buried roots could be expected.

Three of the four canines were fractured horizontally above the gingival margin. The remaining canine was fractured vertically as well as horizontally below the alveolar ridge. Radiographic examination revealed a relatively short root with an associated chronic periapical abscess, as evidenced by lysis of apical bone in the apical region. This canine had super-erupted until the most coronal surface was supra-alveolar with a flap of redundant tissue over the occlusal surface.

The periodontal status around three of the

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four canines was normal. The fourth canine was fractured below the alveolar ridge and demonstrated a periodontal-endodontic lesion. Along the mesial surface of this tooth a sinus tract stoma communicating with the apex could be traced with a periodontal-endodontic lesion. Along the mesial surface of this tooth a sinus tract stoma communicating with the apex could be traced with a periodontal probe.

Surgical Treatment: Because of the absence of pathology, the difficulty of restoration, and the necessity to maintain the size and contour of the alveolar ridge, it was decided to leave the buried incisor roots as they were. The four canine teeth, however, were restored to a shape and size similar to the originals in an attempt to reproduce normal physiologic function, i.e. food deflection, proper distribution of incising forces, and gingival health.

Three separate sessions were necessary to complete the treatment of this female snow leopard. On each occasion, anesthesia was administered while the animal was caged by means of a blow dart containing ketamine (7.5mg/kg body weight). The cat was maintained on halothane anesthesia, following endotracheal intubation. Each surgery was accompanied by antibiotic administrations of 1.2 million units of Penicillin G Benzathine and 1.2 million units of Penicillin G Procaine.

The initial session consisted of extraoral and intraoral examinations. In addition to full mouth radiographs and impressions for study models, periodontal probings were necessary to determine endodontic and restorative procedures and to predict success.

The second session, of approximately five hours duration, was initiated with endodontic procedures. The four fractured canines had pulpal exposures, two teeth had necrotic pulp chambers with vital canals and two had completely necrotic canals with associated periapical abscesses. Both periapical abscesses were visible radiographically. One of the radiolucencies measured 5mm by 5mm with

an associated purulent exudate draining through a sinus tract stoma. The endodontic principles of thorough pulp canal debridement followed by hermetic sealing of the canal spaces were implemented. These root canal procedures required the designing and development of custom files, reamers, irrigation syringes and sealing instruments. The K-type endodontic files were manufactured by Unitek Corporation and modified by Aesculap Corporation with machined and welded extra long handles. The irrigation syringes involved the use of tips modified from urinary catheters and the root canal sealers of gutta percha and zinc oxide base pastes were placed with recontoured instruments.

Following the root canal procedures, three of the teeth were prepared for cast palladium post cores upon which the porcelain fused to gold crowns would be placed. On the maxillary right canine several Thread Mate System pins were placed in the root around a steel vented Whaledent Parapost 1.5mm x 20mm which was cemented into the canal space. A core of composite resin build up material was molded and recontoured for a crown preparation. The sizes and contours of the alveolar ridges required the prefabrication of custom plastic impression trays. Rubber base impressions of the post preparations were taken and inside these impressions plaster models were poured. From these models the final dowel posts and crowns were fabricated. The canal spaces in the tooth roots were temporized with an intermediate filling material and 1.2 million units of Procaine Penicillin G was administered.

Crown placement was performed during the third surgical session of one hour's duration. The temporary filling material was removed and the palladium dowel posts cores were cemented into place. The final porcelain fused to gold crowns were cemented using a permanent zinc phosphate cement. Minor bite adjustments for proper maxillary-mandibular occlusion were

necessary. In addition, minor gingival recontouring to remove functional interferences and hypertrophied gingival tissue was performed.

Discussion

In previous restorative work on larger Bengal tigers and a Jaguar, solid gold crowns were used because of the marked occlusal and tearing forces on the canines. In the case of the snow leopard, given her relatively small size and proportions, porcelain fused to gold was selected. Aesthetically, of course, it was more pleasing. Several weeks post-operatively the animal was able to both tear and masticate meat and bones with no apparent discomfort.

Products Mentioned in Text

1. Carbocaine Anesthetic, Cook-White, 90 Park Avenue, New York, NY 10016. ABE Dental, 519G Marine View, Belmont, CA 94002.
2. Rubber Dams, Hygenic Corp., 1245 Home Avenue, Akron, OH 44310. Rubber Clamps, Henry Schen, Inc., 5 Harbor Park Drive, Port Washington, NY 11050.
3. Files, Unitek Corp., 2724 S. Peck Road, Monrovia, CA 91016.
4. Sodium Hypochlorite-Chlorox Bleach, Payless Drugs.
5. Gutta Percha, Hygenic Corp., 1245 Home Avenue, Akron, OH 44310.
6. Sealer, Dental Drug Supply Co., 1211 Meridian Ave., San Jose, CA 95129.
7. G. G. Burr, R. Chige Inc., 71A W. Merrick Road, Valley Stream, NY, 11580.
8. Portable Dental Unit-Regan Moit. Dental Systems, 20584 Sunrise Drive, Cupertino, CA 95014.
9. Endo Instruments in Kit, Unitek, address above. Aesculap Instruments, 875 Stanton Road, Bellingham, CA 94010.
10. Porcelain, Ceratrac, Johnson & Johnson Inc., East Windsor, New Jersey 08561.
11. Metals-Gold, Palladium, Alloys, Leff, Dental Golds, Inc., Woodside, NY 113.