In our endodontic clinic we have treated two cases with similar histories of frustrated orthodontic treatment where no movement could be activated despite similar coronal exposure as that carried out for Sam. One of these cases also had pre-eruptive invasive coronal resorption. After a multidisciplinary consultation involving an orthodontist, and a peridontist and our endodontic group, it was decided in both cases to treat the unerupted teeth by intentional transplantation, with concurrent treatment of the resorptive defect and endodontic treatment in the case with pre-eruptive invasive coronal resorption. The teeth were very carefully removed surgically with special attention to avoid damage to the root surface. Before the teeth were transplanted into a newly created socket site, the root surfaces were treated with Emdogain and after transplantation, the bone defect was filled with a combination of Bio-oss and Collagen and the area was then covered with Bioguide which is a resorbable membrane. In the tooth without the pre-eruptive invasive coronal resorption, endodontic treatment was commenced prior to the transplantation, but an intra-canal dressing was placed incorporating a cortico-steroid antibiotic combination as this has been shown to control potential reerosion. The tooth will be root filled after some weeks. The patient with the pre-eruptive resorption has been followed up for two years to date and there has been excellent progress.

Transplantation of unerupted canines is not a new technique— it has been used for many years— an orthodontist named Moss published an impressive series in the early 70's while an extensive study has been carried out by Dr Jens Andreasen of Copenhagen— he and his surgical team have very impressive results.

You may be able to buy on Amazon his book dealing with this topic. We believe that the methods we have used which have incorporated some recently developed additional biological materials.

I agree with the comments made by Dr Becker in respect to pre-eruptive coronal resorption— the dynamics of this resorptive process are such that unless it is separated from its vascular supply, it will progress.

As I have said before it would appear that it is time to give Sam a break and use a another technique which will bring his orthodontic saga to a conclusion. Of course no treatment is 100% successful, but Andrease's results suggest a high level of satisfactory tooth retention.

The crown resorption that has occurred is due to clastic cells whose origin is the PDL and not the pulp. I see it as analogous in virtually every detail to invasive cervical root resorption (ICRR) that we published in the Angle Orthodontist earlier this
year (Becker A, Abramovitz I, Chaushu S. Failure of treatment of impacted canines associated with invasive cervical root resorption. Angle Orthodontist, 2013,83:870-876) and was the subject of our presentation at the AAO meeting in Hawaii last year (it's on the disk from the meeting). Additionally, pre-eruptive crown resorption was the subject of the July 2013 Bulletin on my website at http://www.dr-adrianbecker.com/page.php?pageId=273

This is not caries, but resorption. According to the research (see list of refs in that article), it attacks the body of the dentine but stops short at the predentine, which has a much higher organic content and probably does not actually get through to expose the pulp. The diagnosis that there is an open connection was presumably made radiographically, which must be viewed with some suspicion. If the resorption mush is cleared away meticulously, as if it were caries, instrumentation will certainly push through the predentine layer. Cutting off the lesion by minimal mush removal and sealing it off (with the deeper mush still inside) with glass ionomer or other filling material, will effectively stop the resorption by starvation - since its nourishment comes from the PDL and not from the pulp. According to the same research (and again relying on the high degree of similarity between this form of crown resorption and ICRR), in advanced stages, bone is deposited in the lesion (see list of references in the article) and I would hazard an informed guess that this is the factor that stops the tooth from responding to extrusive forces - as in a pure ankylosis. For these reasons, I have recommended surgery to expose the teeth and to seal off the lesions and then to try again. If I am right, the teeth should respond to well directed traction. Once the teeth erupt, then endo can be done under ideal conditions - if it is required for reasons of retention of a crown. Leaving the mush in place and properly sealed, it should not cause a pulpal reaction during this entire period, because it is sterile, uninfected, and now non-progressive. It is not caries and it should not be treated as such, because it contains no bacteria and therefore it does not generate pulp inflammation.
It is entirely possible that my conclusions are not as well founded as I like to believe, but these points represent my line of thinking and are the basis for the recommendations that I made in my correspondence with Dr. Birgitta Bower.