Several factors must be taken into consideration when replacing missing teeth: cost of treatment, periodontal health, aesthetics, biomechanical properties of the prosthesis, as well as patient expectations. Dental implants are becoming the preferable option in many clinical situations, however a number of patients reject this option due to high cost, length of time needed for healing after implant placement or apprehension to surgical dental treatment. The minimally invasive bridge can become the treatment of choice when dealing with defect-free abutments.

I would like to present a case when innovative combined porcelain and fibre-reinforced bridge was constructed and fitted. This bridge was designed as an alternative to traditional porcelain fused to metal resin bonded bridge, which despite obvious advantages like hard tissue preservation is becoming less desirable for aesthetically orientated dentists due to discolouring of abutment teeth caused by metal wings.

Case presentation
A 24 - year-old male patient presented to our surgery with missing upper front central
incisors and upper right canine which he lost four years ago in a car accident. He was extremely disappointed with his acrylic denture and requested fixed prosthesis with life-like appearance. The patient rejected implants as being too expensive, however he stated it will remain his preferable option in future.

At this stage we discussed minimally invasive bridges and the patient felt it was a right option for him. Our treatment plan consisted of traditional RBB to replace UR3 and a hybrid bridge to replace missing central incisors. Due to the small size of the UR3 pontic [width only six mm] we opted for cantilever design with full coverage of palatal cusp of UR4 to increase bonding area and rigidity.

The preparation involved only light chamfer line. This bridge was fitted with Panavia [Kuraray Co], and no preparation was made for UR2-UL2 bridge. Impressions, dyes and working casts were made using conventional methods and materials. The next step was to form a wax pattern with inner canal, which was filled with fibre-reinforced composite core at the later stage. Small irregularities inside the canal will create additional mechanical anchorage. The wax pattern was converted to replicate in dental alloy using lost-wax technique and then porcelain was added and tried-in to ensure good aesthetic result.

Prior to glass fibre application Alloy primer [Kuraray Co] was applied to sandblasted metal surface to increase bonding strength of composite to dental alloy. At this stage we covered the labial wall of the inner canal with one mm of Gradia composite and light cured. Pre-cut single pre-impregnated fibre strip was inserted [Dentapreg PFU] and bonded to both ends with flowable composite [Filtek, 3M]. The outer layer of composite was built incrementally with Gradia.

The strip must be completely embedded in resin to protect glass fibres from oral exposure; the retainers were formed and light-cured using the same principle. Additionally, after shaping and finishing, the bridge can be placed into the light curing unit, eg.Dentacolor XS [Kultzer], for the final application of light to
maximise polymerisation of fibre-reinforced composite. Bridge delivery involves the same procedures as for all bonded restorations.

"Bonding areas of prosthesis were sandblasted, following by etching and application of bonding agent"

Abutment teeth were cleaned with pumice and rubber prophy cup, etched with 37 per cent phosphoric acid and thoroughly rinsed, then lightly dried and treated with bonding agent. Bonding areas of prosthesis were sandblasted, following by etching and application of bonding agent. Low-viscosity, dual-cured resin luting material (RelayX Unicem) was placed inside the retainers. After insertion, the excess of luting cement was removed with floss and small brush and prosthesis light-cured. The luting cement will form unified structure with composite retainers linking them to the etched enamel. Final occlusal adjustments were made using a high-speed hand piece and composite polishing bur.

Discussion

This type of bridge may prove to be a successful way for fixed tooth replacement in anterior and premolar areas as well as long term provisional restoration, providing many benefits for patients resulting from aesthetic appearance of porcelain pontic, due to the good adhesive property of fibre-reinforced composite and minimally invasive nature of resin bonded bridge. Porcelain pontics and crowns continue to be a mainstay of fixed prosthodontics with long track record of reliability, low plaque accumulation and shade stability. Fibre-reinforced bridges alone did not gain wide spread acceptance among dental practitioners, however many publications underlined high potential of this technique resulting from favourable mechanical properties, good bonding and ease to repair. Further improvements and clinical developments are needed to combine glass fibre with porcelain pontic, but this idea shows great potential.

References