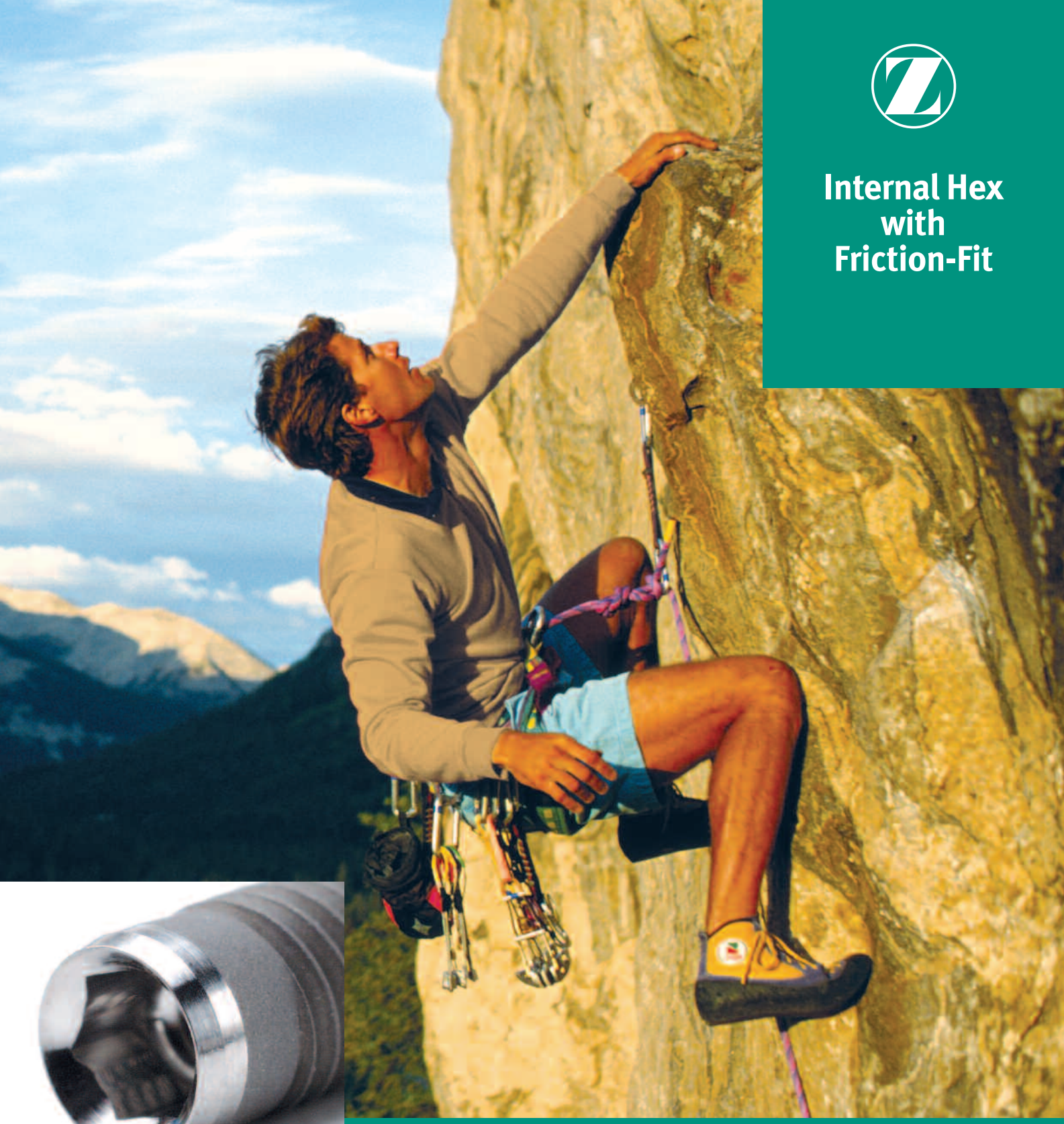
Internal Hex with Friction-Fit



Rock-solid fit.
A connection you can depend on.

zimmer | dental
Confidence in your hands™

Zimmer Dental's patented friction-fit abutment connection.

Drive a piton deep into rock, and it locks firm, giving the climber a solid secure base. Friction-fit abutments form a cold weld connection with the implant, essentially eliminating micromovement, tipping and the effects of vibration. Screw loosening virtually disappears, along with the hours spent on free adjustments and remakes.

Friction-fit technology far surpasses that of standard external and internal hex connections. External hexagons fall short because they were originally created only to drive the implant into the surgical site; their outdated design was never meant to serve as an anti-rotational device.

Without friction-fit, other internal connections face limitations as the effects of micromovement may not be completely eliminated. Only when you combine the two technologies, friction-fit and internal hex, do you reach the most advanced evolution in implant connections – Zimmer internal hex with friction-fit.

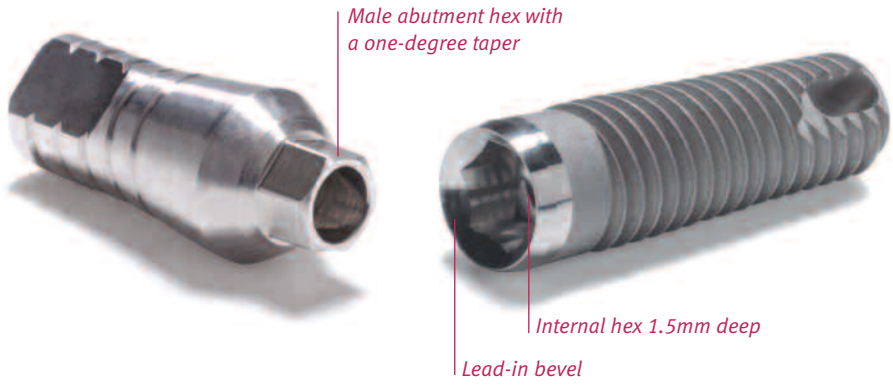
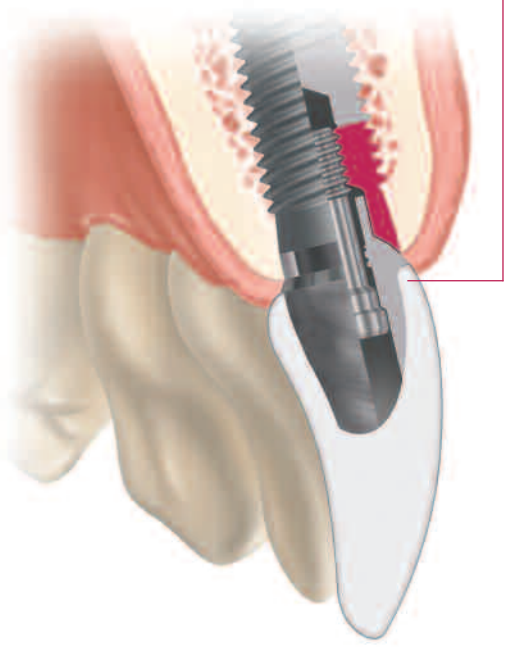


Figure 1 Abutments for *Tapered Screw-Vent*® and other Zimmer internal hex implants have a male hex that tapers one degree from the base of the abutment body to the bottom of the hex. As the abutment is seated into the implant under applied torque, the abutment hex frictionally engages the walls of the implant's internal hex. The result is a friction-fit that virtually eliminates rotation between components.

Zimmer internal hex with friction-fit: Unmatchable performance by design.

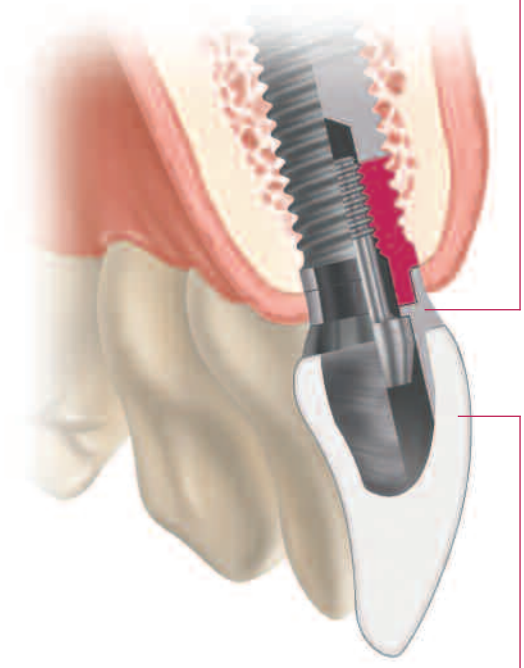
- The friction-fit of the 1.5mm deep internal hex distributes forces deeper within the implant, shielding the retention screw from excessive loading.[1]
- The lead-in bevel improves ability to seat the abutment easily and properly.
- Unique friction-fit abutments create a virtual “cold weld” with the implant when fully seated. This connection virtually eliminates rotational micro-movement, tipping and vibration-related micromovement of the abutment – leading causes of screw loosening.
- Reduced screw loosening means greater patient satisfaction and less time spent on complimentary adjustments and remakes.
- The low profile of the internal connection improves esthetics and allows for a more natural emergence profile, especially in esthetic areas.

Natural esthetic result due to depth of prosthetic emergence allowed by internal hex connection



Internal hex with friction-fit – the esthetic solution

Metal exposure due to excessive abutment cuff height to accommodate external hex



External hex – inferior esthetics

Bulky emergence profile due to excessive abutment flare to accommodate external hex

*Implants highlighted in red indicate cross sections of both internal and external connections.

Zimmer internal hex advantage.
The only hex abutment that truly locks into place.

Compared to other internal hex connections.

- Zimmer Dental abutments for internal hex implants have a tapered male hex that frictionally engages the implant, resulting in zero degrees of rotational movement between the implant and abutment when tightened to the recommended torque of 30Ncm.[1]
- Without the friction-fit hex combination, implants with internal engaging geometries are just like an external hex turned upside down, allowing for movement between components.
- To overcome rotational problems with their connections, competitors have attempted various design modifications, including strengthening screws, increasing clamping forces, and varying hex dimensions. Only Zimmer Dental has an internal hex connection that virtually eliminates rotation by design.

Compared to traditional external hex connections.

- Zimmer Dental's internal hex with friction-fit abutments virtually eliminates rotation when components are fully seated.[1]
- In contrast, external hexes typically have a rotational misfit of 3 to 10 degrees between the implant and abutment.[2]
- Screw loosening of external hex implant components is documented up to 38% of all single-tooth, partially and fully edentulous cases.[3]

In the U.S., call your Zimmer Dental Sales Consultant or Customer Service at 800 854 7019 to find out how Zimmer friction-fit products can improve your practice. Outside the U.S., please refer to the contact information located on the back of this brochure.

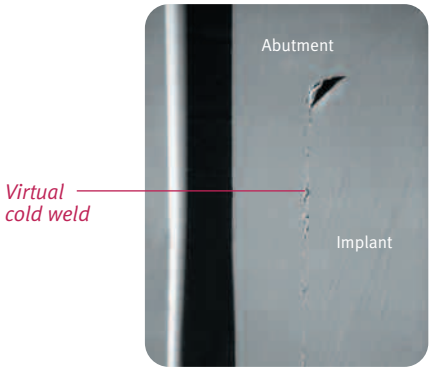


Figure A SEM at 50X magnification shows intimate contact of the internal hex implant at both the beveled implant/abutment interface and the hexagonal engagement area.

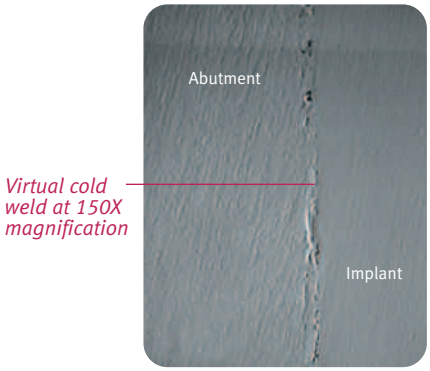


Figure B SEM at 150X magnification displays the mechanical interlock in the hexagonal engagement area between the flats of the implant and abutment.

Proudly offering one of the most comprehensive dental implant product lines available, Zimmer Dental is a market leader in the development of world-class implantology products, practice-building strategies and educational programs focused on empowering clinicians and improving patients' lives.

Intimate friction-fit

Rotation between the implant and abutment results in screw-joint loosening. Zimmer Dental's friction-fit abutments virtually eliminate rotation when fully seated, minimizing costly repairs and repeat visits. Scanning Electron Micrographs reveal the intimate fit that results in a virtual "cold weld" of Zimmer Dental components (Figures A, B).

The evolution and evaluation of two interference-fit implant interfaces.

Abstract and Conclusions

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Postgraduate Dentistry
1996:3(1)

Component misfit has been implicated as one of several important factors in screw-joint failure and screw loosening in dental implants. Recent evidence indicates that rotational misfit may be more important in screw-joint stability than originally anticipated. Efforts have been made to reduce and/or eliminate rotational misfit with different nonrotating implant interfaces. The effectiveness of an interference-fit implant interface is reported in this article. The implants were evaluated for rotational movement, the intimacy and nature of hexagonal contact, the adequacy of the implant/abutment interface seal, and machining consistency of the hexagonals and implant. Currently available components are contrasted with components that were available initially in the evolution of the friction-fit/interference-fit interfaces. Significant improvements and refinements have been incorporated into the current generation of components.

Conclusions

The friction-fit hexagonal implant was evaluated and contrasted for machining consistency, interface fit, and rotational stability. From the data presented, the following conclusions can be drawn:

1. Rotational freedom (misfit) for the [Screw-Vent] implant/abutment systems...was 0 degrees...when fully tightened to 30 Ncm.

2. The SEM and microphotograph cross-sections document intimate hexagonal contact and interference fit that results in abutment rotational stability.

3. Refinements in machining tolerances and the availability of a reliable method of torque application have resulted in predictable and consistent implant/abutment interface seals.

References

1. Binon PP: The evolution and evaluation of two interference-fit implant interfaces. Postgraduate Dent 1996;3:3-13.

2. Binon PP: Evaluation of machining accuracy and consistency of selected implants, standard abutments and laboratory analogs. Int J Prosthodont 1995;8:162-178.

3. Goodacre CJ, Kan JYK, Rungcharassaeng K: Clinical complications of osseointegrated implants. J Prosthetic Dent 1999;8:537-552.

Optical cross-section micrographs of the Screw-Vent implant/abutment combination were evaluated. This image illustrates the typical intimate contact and friction-fit between the internal straight hexagon of the implant and the external 1-degree tapered hexagon of the abutment.
The beveled seating area also demonstrates full contact and an intimate seal.

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