Lava™
Precision Solutions
精密修复的最佳系统

至臻
至美

3M

Lava简介

Lava是世界500强公司3M的数字齿科产品品牌名称，其包括整套的数字化修复解决方案：Lava C.O.S椅旁扫描仪，Lava加工中心CAD/CAM设备，Lava Connect数据传输与管理网络，以及用于修复体制作的Lava切削材料等。目前国内已上市Lava氧化锆耗材以及Lava加工中心CAD/CAM设备、Lava Connect数据传输与管理网络。未来还将会有Lava C.O.S椅旁扫描仪以及更多品种的Lava切削材料，如超高透氧化锆，纳米树脂，玻璃陶瓷等等。

自2001年面市以来,Lava全瓷修复系统已成为业界的奇迹。忙碌运转在40多个国家的Lava系统业已生产出数以百万计的Lava修复体，使全球范围内的患者受益。

Lava全瓷修复系统是经最全面临床验证的CAD/CAM系统，迄今为止，全世界已发表超过100篇研究。Lava的卓越临床效果为超过10项大型临床研究证实，多达1,500个修复体，随访时间长达8年。这些研究充分证明Lava的超高强度，完美的边缘密合度以及无以伦比的美学效果。

About Lava

Lava is the brand name of 3M digital dentistry. It provides dentists a total precision solution by a digital workflow. Lava includes Lava C.O.S (Chairside Oral Scanner), Lava CAD/CAM system, Lava Connect network and Lava machinable materials. Currently, Lava CAD/CAM system, Lava Connect network and Lava Zirconia have been launched in China market. In near future, a series of machinable materials will enter China, i.e. ultra transluncent zirconia, glass ceramic and nano resin composite.

Since its instruction in 2001,Lava Zirconia has become a huge success story. Millions of restorations have been produced and Lava System are running in 40 countries abound the globe.

Lava Zirconia is one of the most thoroughly tested CAD/CAM materials on the market with over 100 studies published by researchers world wide. Clinical excellence is proven by more than 10 clinical studies with more than 1,500 restorations placed and followed up to eight years. These studies validate why Lava is known for high-strength with outstanding marginal fit and excellent aesthetics.

Lava™

完美解决方案

Lava C.O.S. 椅旁数字扫描系统

数字印模

突破性的将数字影像技术应用在口腔领域，在极大的提高患者舒适度的同时，确保了印模的精确度和快速的数据传输。

至臻至美

真正完美的
CAD/CAM修复体

Lava™ --为患者、牙医和技工中心提供的完美解决方案

Pentamix 3
印模材自动混配机

传统印模

经过长达40年的临床验证和改进的传统取模方式

Lava™ Scan ST扫描系统
最高精度的扫描仪，同时配有智能软件（如回切功能可自动设定均匀厚度的饰面瓷，降低崩瓷发生率）

高效产出

Lava CNC500 & CNC240精密切削系统
（只可使用德国进口Lava瓷块，确保医生和患者的利益）

Lava™蜡块

Lava™ DVS
饰面瓷块

Lava™氧化锆瓷块
正品Lava瓷块拥有两个条型码：左边是收缩率，右边是防伪条码，高效智能

速·美双修

烧结流程

Lava™ Furnace 200烧结系统
设计巧妙的烧结配件确保收缩比例的精准控制

氧化锆都是一样的吗

后牙全瓷修复体过去仅限于单个单位。CAD/CAM技术可以采用高强度陶瓷制作修复体。现在有了齿科用氧化锆，医生们可以制作前牙或后牙区的多单位修复体，这得益于氧化锆出色的弯曲强度和断裂韧性。然而，不同生产商的氧化锆加工方式各不相同，稳定性也有差异。比如说，并非所有的厂家做过完整的体内和体外临床研究。修复体的品质取决于生产过程中细致精确的控制以及材料耐久性的全面深入的检测。

不同品牌氧化锆的不同之处：

1. 制备中的各项参数设置关系到预烧结的氧化锆的性能；
2. 氧化锆粉体的差异影响修复体的强度、长期稳定性和透光性；
3. 制备的条件、方法影响修复体的边缘密合度、强度和透光性；
4. 预烧结条件影响瓷块的强度和机加工性；
5. 氧化锆的染色可以影响材料的边缘密合性、强度以及透光性；

虽然化学组分相同，或许肉眼难以分辨，但寿命与耐久性，美观性绝对存在差异。生产氧化锆的厂商非常多，医生在使用时需要询问技师的是：瓷块的品牌，来源，是否符合SFDA的标准并有注册证，是否有足够的科学与临床数据支持，以及正品保障。从而保障自身以及患者的权益。

Are all zirconias the same?

Ceramic restorations in the posterior region were once limited to single units. CAD/CAM technology made it possible to prepare restorations out of high-strength ceramics. Now, with the introduction of zirconia as a dental material, clinicians can place multi-unit restorations in both the anterior and posterior regions. This is due in part to the high flexural strength and fracture toughness of zirconia. Zirconia materials from different manufacturers, however, may be processed differently and have varying levels of stability. Not all manufacturers, for example, have completed adequate in vitro and in vivo clinical studies. Final restoration quality is directly dependent on careful and accurate control of the manufacturing process and thorough testing to substantiate material reliability.

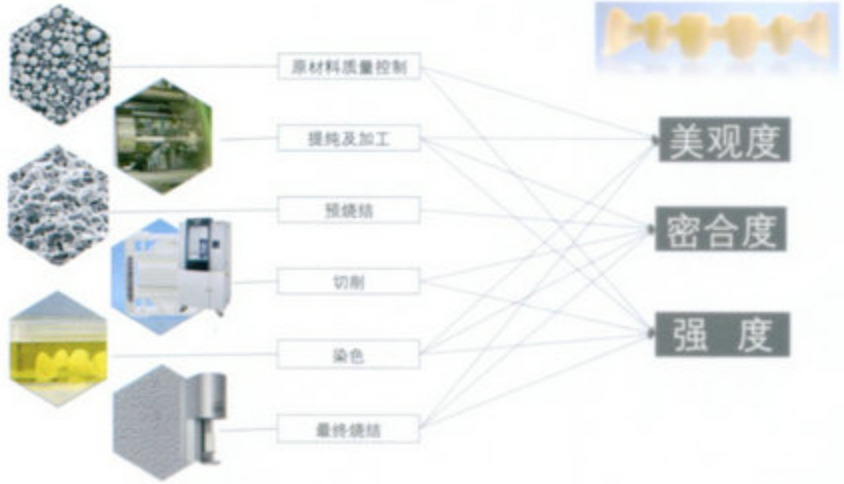
What can be different?

1. Processing parameters for pre-sintered zirconia affect performance attributes.
2. Differences in the zirconia powder affect the strength/long-term stability and translucency of the restoration.
3. The pressing condition and pressing method affect the marginal fit, strength and translucency of the restoration.
4. Pre-sintering conditions affect the strength of the pre-sintered material and its millability.
5. Coloring of the zirconia can affect the marginal fit, strength and translucency of the material.

Under multiple options for you, dentists should ask your partner lab for the brand, source, license; n vitro and vivo research data and warranty. Although the zirconia ceramic is chemically similar, once processed, it can exhibit different mechanical , optical characteristics and longevity.

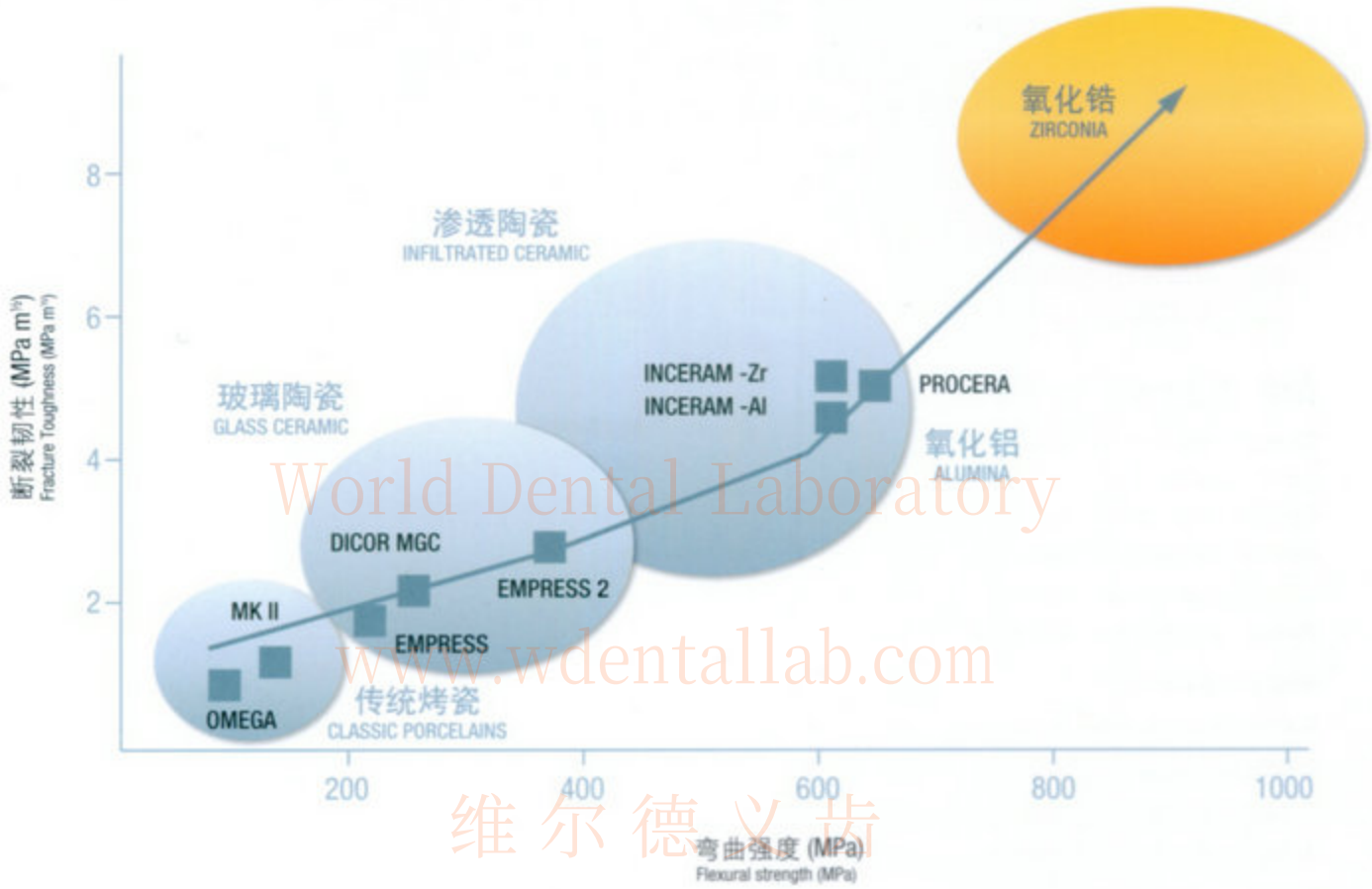
不同品牌的氧化锆质量是有差异的

生产过程工艺控制水平不同会导致不同的产品质量。



犹如不同品牌的咖啡，
口感和品质都是有差异的

全瓷材料力学性能对比
All Ceramic Materials



氧化锆的优势与选择方案

氧化锆是全瓷修复材料中的一种，具有全瓷材料所具有的美观性好、无金属、安全等特点。同时与其它全瓷材料如氧化铝、玻璃陶瓷类的铸瓷、渗透陶瓷相比，氧化锆具有无可比拟的断裂韧性和弯曲强度等力学性能。在口腔复杂应力与温度环境中，寿命更为持久。

因此氧化锆具有更为广阔的适应范围，除了前后牙冠与多单位桥，也可制作种植体个性化基台，嵌体桥，马里兰桥等。

Advantages of Zirconia and indication

For many years now, we have only had two basic options when it came to restorations--

1）Something strong but with esthetic limitations– All metal or Porcelain fused to metal

2）Or something life-like and esthetic but very brittle

With the introduction of zirconia, we now are approaching "the best of both worlds" – strength and beauty. In the environment of oral cavity with complex stress and temperature alternation, zirconia has longer longevity as compared to other all-ceramics.

Therefore, zirconia has wider indication from single to multiunits and custom-made abutment.

Lava氧化锆修复体的特点与优势

如前所述，氧化锆是不一样的。Lava氧化锆从原材料粉体的处理到最后的瓷块加工，每个步骤都有严格的质量控制。从而确保Lava氧化锆具有以下优势：

1. 出色的力学性能

不仅静态试验弯曲强度1440Mpa，模拟口腔环境中，10年循环加载后仍具有超高强度，满足临床需求。而长期实验结果恰恰为最关键数据支持。

2. 无与伦比的边缘密合性

每个瓷块的收缩编码保证收缩完美控制。众多试验表明，Lava修复体在同等试验条件下，密合度最佳。

3. 在所有氧化锆产品中拥有最好的透光性

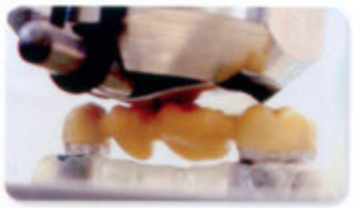
专利染色技术提供多样颜色选择。

4. 全球防伪

瓷块防伪条码保障医生与患者权益。

5. 多年临床数据支持

Lava是Dental Advisor唯一公布长达八年临床数据跟踪的修复体，口内保存率100%。



Lava经过多道严格测试

最佳边缘密合度

Dr. Masseroni and MDT R. Pascetta
修复体就位时带给您全新的密合体验

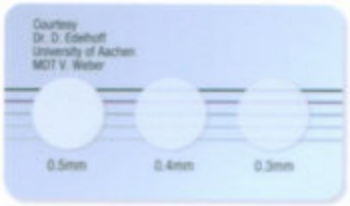
Lava Zirconia

As mentioned above, zirconia is not alike. Lava zirconia is manufactured from strict raw materials purification to final computerized sintering through a highly stringent control in process. Lava offers dentists restorations with incomparable high quality as followings,

1. High strength and long-term stability under both flexural loading and aging condition.
2. Perfect marginal fit
   Every Lava Zirconia blank has a unique shrinkage factor coded into the blank to ensure precision process consistency.
3. Excellent translucency and patented shading system guarantee esthetics.
4. Lava™ Authentication Program.
5. The study with the largest case number and longest restoration time was published by THE DENTAL ADVISOR™. Lava was assessed to "perform exeptionally well ".

Lava™内冠剖面
内外颜色均匀一致，非常美观

其他品牌的内冠剖面
染色不均，且会变色影响最终的美观性



高强度的Lava材料，以及先进的3M Lava设备可以切削出0.3mm厚度的前牙内冠（大多品牌只能切到0.5mm），通过Dr. D. Edelhoff的研究我们可以看到，0.3mm厚度的氧化锆拥有非常完美的通透度。

双重防伪　保障您的权益

- Lava独有的全球、中国双重防伪，确保您的利益不受侵害；
- 配戴前请务必确认包装盒里拥有全套以下物品：修复体、全球防伪卡（背面贴有全球防伪标签）、中国防伪卡（背面密码完好遮盖）；
- 建议尽快登录www.3m.com.cn/dental，点击"Lava防伪验证"，按照提示输入防伪号码，查验真伪；请将"医生留档"部分粘贴在病历上，并将防伪卡交予患者保存；如有疑问，请联系3M工作人员。

第三方权威机构
多年临床跟踪

THE DENTAL ADVISOR
++++½
www.dentaladvisor.com
极好的 +++++
非常好 ++++
优良的 +++

Is Zirconia safe?

氧化锆安全吗？

医用与牙科使用的氧化锆在生物安全性方面表现均非常出色。多年来，大量实验与临床病例证明氧化锆对骨、软组织细胞均无毒性损害。也未见过敏反应报道。

患者往往担心氧化锆是否有放射性。实际上氧化锆来源的锆石，需要经过提纯处理、粉体加工等多个步骤，加工过程会去除所有的杂质。ISO标准对上市的所有陶瓷材料有严格的标准，只有满足放射性实验要求后才可作为医用材料。而且不仅仅对氧化锆有要求，对饰瓷、氧化铝、玻璃陶瓷等也有同样的放射性合格要求。实验表明纯化氧化锆粉体放射性不仅小于玻璃陶瓷，甚至低于人类骨组织。当然这也提醒我们一定要关注所使用氧化锆产品的来源，其生产厂家是否取得SFDA批准以及生产工艺的一致性和稳定性也是至关重要的。

氧化锆有时会被误认为是金属的一种。这是混淆了金属元素和金属的化学概念，氧化锆并非锆金属或锆石，虽然含有金属元素，但是却是氧化物陶瓷。这如同氯化钠（食盐的化学成分）与金属钠的区别。

因此正规厂家生产的医用氧化锆材料是绝对安全的。Lava氧化锆产自德国，生产过程对每个环节严格控制，安全性方面有大量数据与报告，远高于ISO及YY（中国牙科陶瓷标准）要求。

Is zirconia safe?

There are no known allergic reactions of medical device made of zirconia. Furthermore, zirconia reveals absolutely no potential for cytotoxicity.

Some patients may worry about the radioactivity of zirconia restorations. When the raw mineral materials are processed, the strict procedure will be implemented to purify them to remove off all impurities. All the zirconia for medical usage need fulfill the requirements of ISO standard, as well as other all-ceramics. It has been proved purified zirconia powder is absoluty safe. We can learnt that how important the quality, source and process of manufacturing are for your product selection.

Claims which maintain that zirconia is metal, are false. Such misinterpretations are probably because that people sometimes is confused by the terms zirconium or zircon and zirconia.

In conclusion, zirconia is safe to be used as dental ceramics. Lava Zirconia Frame is 'Made in Germany'. To be precise in the 3M ESPE facility in Seefeld, Bavaria. Here the material were optimized over all steps to achieve a perfect outcome, including safety.

氧化锆修复体的崩瓷率高吗？

大量研究表明，氧化锆的崩瓷发生率并不比传统烤瓷修复体高。

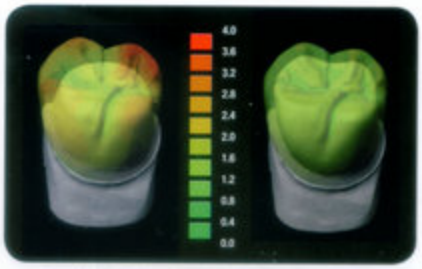
研究发现氧化锆的崩瓷主要发生于饰瓷内部而非饰瓷与氧化锆基底冠界面。

而引起崩瓷发生的主要原因有三方面：

（1）底冠形态设计不良，局部表面饰瓷过厚；

（2）饰瓷烧结时未按标准要求进行温度控制，比如快速冷却；

（3）医生调殆后未进行合理的处理：比如再上釉烧结、或者标准三步抛光等这都是必要的步骤。



Lava软件中的回切功能可避免内冠形态设计不良引起的崩瓷（右图设计良好）

Chipping of ziconia supported restoration

Recent studies demonstrated that there was no statistical difference of chipping between zirconia and metal supported restorations. Chipping in zirconia happened often internal structure of veneerings, but the interface. The major reasons includes :

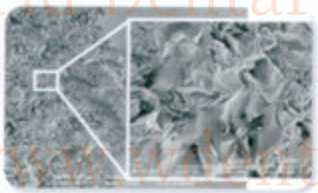
（1）improper coping design, thicker porcelain;

（2） inappropriate fusion control.

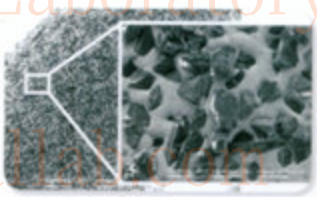
（3）For dentists, no or incorrect further treatment after grinding will lead to chipping.

3 step polishing or glaze is mandatory.

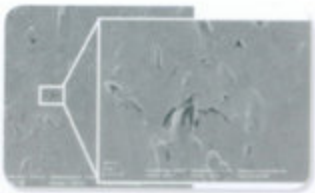
（1）完成最终烧结的饰瓷表面电镜图



（2）红标金刚砂车针打磨后造成饰瓷表面损坏



（3）红标金刚砂车针的表面电镜图



（4）标准三步抛光处理后电镜图

调殆对氧化锆修复体有影响吗，如何避免负面影响

如前所述，调殆后会造成饰瓷表面的破坏，必须经过后处理，如上釉烧结或抛光。然而大量的调磨会大大影响修复体的强度，有可能会引起断裂。如修复体制作不当，推荐重新取精确印模返工制作。

如对氧化锆的少量点磨，推荐精细金刚砂车针（如Brasseler #8881）。在充分水冷下进行对强度影响较小。但是如果打磨区域过大，则一定会造成强度下降。如要调磨内冠，造成风险请与技师沟通。

Is grinding detrimental to crown?

As mentioned above, ajustments resulted in surface claws which can serve as crack initiation sites. If possible - Don't do it!

If you have to do adjustments:

- Take a very fine diamond bur (red ring or finer)
- Use copious amounts of water
- Polish, Polish, Polish or glazed

If you have to do large corrections on a regular basis

- Check your impressioning, bite taking and cementation techniques
- Discuss with your lab
- Do a try-in and corrections BEFORE the final glaze firing

Once coping or framework is sintered and if any grinding is necessary, use a new fine diamond (e.g. Brasseler #8881) under copious amounts of water just for very limited area. Please contact your lab partner, if you have to grind zirconia coping and consider the possibility of fracture.

全氧化锆会对对颌牙造成过度磨耗吗？

对于一些咬合紧、备牙空间不足的患者，全氧化锆修复体是一个不错的选择。如果您担心会对对颌牙造成过度磨耗，则大可不必。因为氧化锆的磨耗性能取决于表面的光滑度，而非硬度。因此，全氧化锆修复体经抛光或上釉后，并不会造成对颌牙的过度磨耗。

调磨后请交由技师上釉，或自行抛光。推荐的氧化锆抛光品牌有EVE，DFS，固美氧化锆抛光套装等。

Lava全氧化锆桥

Will all zirconia cause over abrasion of antagonist?

For the patients with little inter-occlusal space or bruxism, dentists can choose all zirconia restorations.

Summary of the actual literature:

- To minimize antagonist wear, the surface of the restorative material has to be fine-grained and smooth.
- If monolithic Zirconia is used, the surface must always be polished or glazed when the antagonist is natural tooth.
- Less enamel wear should be expected on polished surfaces due to the lower friction coefficient.
- Surface roughness of the antagonistic ceramic influenced the wear of human enamel

Recommendation of polisher brands: EVE, DFS, Komet

Lava全氧化锆冠

金属烤瓷冠

氧化锆粘结要注意什么，与其它全瓷有何不同？

氧化锆粘结相对玻璃陶瓷而言，比较简单。因为其良好的强度，因此粘结剂的选择非常广泛。我们推荐使用Relyx Unicem自粘结树脂水门汀，粘结前无须医生做表面处理。其活性基团与锆离子结合，可获得化学结合力。此外还有多种颜色选择。

Relyx Unicem自粘结树脂水门汀

Cementation of zironia

Lava strength allows conventional cementation for crowns and bridges

You can make single posterior crowns out of feldspatic glass. However, these materials need to be adhesevly bonded to the tooth to stabilize the restoration. Adhesive cementation can be challenging e.g. in cases with sub ginigival margins, where excess removal is cumbersome.

RelyX Unicem contains phosphoric acid functional groups which bond to zirconia surface. It is highly recommended.

Lava™ 系统的可用范围
Copings and Frameworks

因为其卓越的机械和美学特性，3M ESPE Lava™ 氧化锆拥有广泛的适应征:

Due to its excellent mechanical and optical characteristics, 3M™ ESPE™ Lava™ Zirconia frameworks can be used for a wide range of indications.

图1：单冠
Fig. 1: Single Crowns

图2：联冠
Fig. 2: Splinted Crowns

图3：3单位桥
Fig. 3: 3-unit Bridges

图4：4单位桥
Fig. 4: 4-unit Bridges

图5：5单位桥
Fig. 5: 5-unit Bridges

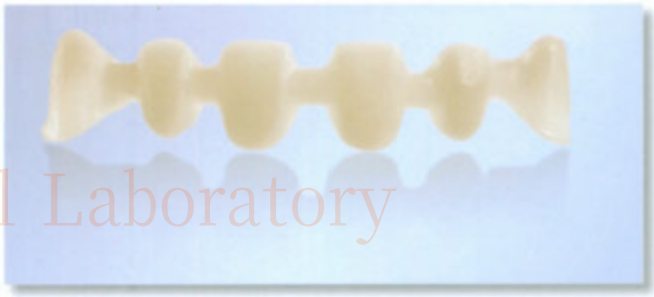


图6：6单位桥
Fig. 6: 6-unit Bridges

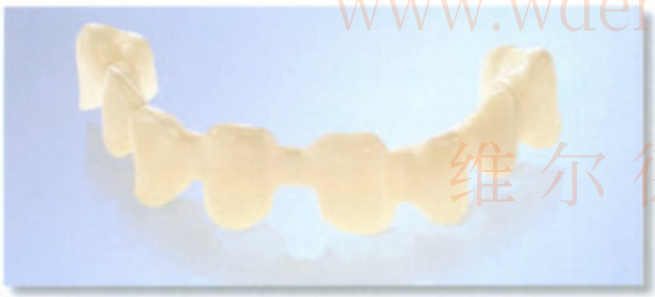


图7：有曲度的和长跨度的桥(最长达48mm)
Fig. 7: Curved and Long-span Bridges

图8：悬臂桥(磨牙症患者除外)
Fig. 8: Cantilever Bridges
(excluded for patients with bruxism)

图9：嵌体桥和高嵌体桥(磨牙症患者除外)
Fig. 9: Inlay Bridges and Onlay Bridges
(excluded for patients with bruxism)

图10：前牙粘结性桥(磨牙症患者除外)
Fig. 10: Anterior Adhesive Bridges
(excluded for patients with bruxism)

图11：套筒冠
Fig. 11: Primary Crowns/Telescopes

图12：种植体基台
Fig. 12: Implant Abutment

图13：氧化锆全冠
Fig. 13: All Zirconia

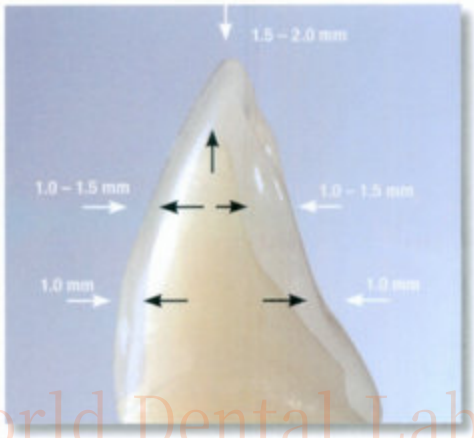
Wide range

理想的牙体预备：肩台或斜面可以允许边缘的精确测量
Ideal Preparation: Shoulder or Chamfer?

理想的预备应包括360°肩台或浅凹型肩台。肩台预备的内侧角一定要圆滑。所有殆面切面边缘也要圆滑。边缘线连续且清晰可见。一定要避免产生刃状肩台。

A reduction of the tooth structure based on the dimensions indicated below is sufficient. We recommend a preparation matrix of the initial clinical situation in order to check the progress of the tooth preparation. Ideally, the preparation includes a circumferential shoulder or chamfer with a horizontal angle of at least 5°. The vertical preparation angle should be at least 4°. The inside angle of the shoulder preparation must be given a rounded contour. All occlusal and incisal edges should also be rounded. The marginal edge of the preparation needs to be continuous and clearly visible. A bevel should be avoided.

Ideal



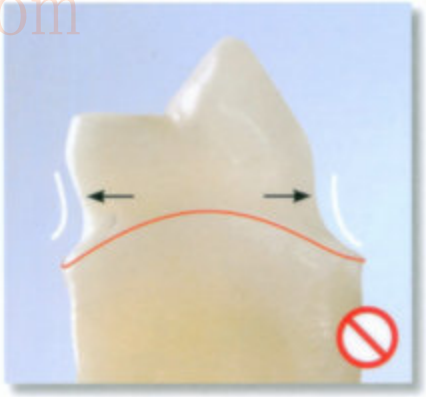
前牙建议备牙量
Recommended preparation for anterior teeth.

后牙建议备牙量
Recommended preparation for posterior teeth.

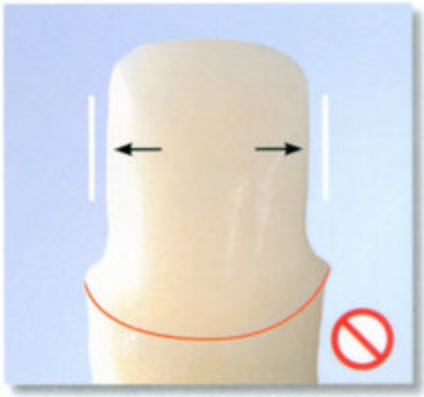
不可接受的牙体预备

沟槽式制备：边缘不能被清晰地检出。
Gutter Preparation: Margin cannot be detected clearly.

90° 肩台：边缘不能被清晰地检出。
90° Shoulder: Margin cannot be detected clearly.



一定要避免倒凹。
Undercuts must be avoided.



平行壁：原则上，平行壁制备是可行的。然而，在这种情况下粘结间隙是切割不出来的。这可能会在很大程度上影响就位。
Parallel wall preparations result in a cement gap that cannot be milled. This may signifi cantly affect the fit. A 5° taper should be used.

一定要避免尖锐的切缘-殆面边缘。弧形半径应>0.4mm。
Sharp incisal-occlusal edges must be avoided. The rounding radius should be > 0.4 mm.

由于就位道的限制,不能制作有倾斜牙的桥。
Bridges with inclined teeth cannot be achieved due to the restricted path of insertion.