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基础研究

添加纳米载银无机抗菌剂的室温固化PMMA材料体外抗菌效果评价

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摘要：

目的: 研究添加纳米载银无机抗菌剂的室温固化聚甲基丙烯酸甲酯(PMMA)材料在体外对变形链球菌和白色念珠菌的抗菌效果，并检测纳米载银无机抗菌剂对室温固化PMMA材料机械性能的影响。方法: 采用球磨法将纳米载银无机抗菌剂按0%、0.5%、1.0%、1.5%、2.0%、2.5%和3.0%添加到室温固化PMMA材料中，并制成抗菌试件，应用贴膜法测定这些抗菌试件在体外对变形链球菌和白色念珠菌的抗菌率。并在电子万能材料试验机、冲击试验机和摩擦磨损试验机上对这7种添加比例的抗菌试件进行弯曲强度、冲击强度和磨损性能的测试。结果: 抗菌剂含量为1.0%时，对变形链球菌和白色念珠菌的抗菌率均达到50%以上；抗菌剂的含量为2.5%时，对变形链球菌和白色念珠菌的抗菌率均达到90%以上。抗菌剂含量在1.0%～1.5%范围内3种机械性能较对照组均有所提高，随着抗菌剂含量的增加，3种机械性能逐渐降低。当抗菌剂含量超过2.0%时，磨损性能与对照组比较差异有统计学意义（P<0.05）；当抗菌剂含量超过2.5%时，弯曲强度和冲击强度与对照组比较差异有统计学意义（P<0.05）。结论: 添加纳米载银无机抗菌剂的室温固化PMMA材料显示了良好的抗菌效果，随抗菌剂含量增加，抗菌率逐渐提高。抗菌剂含量为2.0%时，既可以达到临床对抗菌的要求，又不会对室温固化PMMA材料的机械性能产生显著的影响。

关键词： 纳米载银无机抗菌剂；室温固化；聚甲基丙烯酸甲酯；抗菌率；球磨法

Evaluation on in vitro antibacterial effect |of room curing polymethylmethacrylate material adding nano-silver base inorganic antibacterial agents

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Abstract:

Abstract:Objective To investigate the antibacterial effect of room curing polymethylmethacrylate(PMMA) material adding nano-silver base inorganic antibacterial agent and to detect the changes of its mechanical property.
Methods Nano-silver base inorganic antibacterial agent was added to the room curing PMMA material in the range of 0.5%-3.0% at an interval of 0.5% by ball milling to make specime.Antibacterial rates of the specimes were detected by film method.Bending strength,impact strength,and wear resistance of the specimes were respectively detected on electronic universal testing machine,impact test machine and friction and wear test machine.Results The antibacterial rates of Streptococcus mutans and Candida albicans were more than 50% when antibiotics content was 1.0%.The antibacterialrates of Streptococcus mutans and Candida albicans were more than 90% when the antibiotics content was 2.5%.The three mechanical properties were increased compared with control group when the antibacterial agents were in the range of 1.0%-1.5%.Then the three mechanical properties were decreased with the increasing of antimicrobial concentration.When the antibiotics content was 2.0%,the wear resistance had significant difference compared with control group (P<0.05); when the antibiotics content was 2.5%,the bending strength and impact strength had significant difference compared with control group (P<0.05).Conclusion The antibacterial effect of room curing PMMA adding nano-silver base inorganic antibacterial agent is ideal.The antibacterial rate is increased gradually with the increasing content of antibacterial agents.There is no significant effect on the mechanical properties of room curing PMMA material,but the antibacterial effects are satisfied when the content of antibacterial agents is 2.0%.

Keywords: nano-silver base inorganic antibacterial agent room temperature curing polymethylmethacrylate antibacterial rate ball milling method

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