



3D Printers

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ilovebraces

Member Since: 08/21/11

Post: 1 of 16

Does anyone have an in-office 3D printer? We have an iTero scanner but we also have an in-house lab person so we still take alginates for retainers, expanders, etc.

Great Lakes Orthodontics sells the Objet 30 for \$44,295. A little rich for my blood.

Then I found the Maker Bot Replicator two for \$1,999. Much more reasonable price. I just don't know if the models would be accurate enough. ■

DEC 18 2013

Dr-T

Member Since: 05/19/09

Post: 2 of 16

I am also interested in purchasing a 3D printer. The dental ones just seemed 100 times more expensive than the ones for commercial use. I think this is something we will see significant price drops within the next few years. ■

DEC 18 2013

orthothai

Member Since: 10/14/13

Post: 3 of 16

The reason for the difference in price is the degree of precision you need. A 3D printer at \$2,000 will have a good definition but not a good precision, it will not be useable in clinic.

My father works in jewelry and they are using a lot of 3D printing (design on computer, and wax or resin printing before casting). His company was looking to buy one; the prices are around the same \$40,000 - \$60,000 and you must have a contract for maintenance.

If you want to have consistent precision results, you need to have the machine calibrated almost weekly. I am not sure that the price will drop in the near future. The precision, which is critical in dental, is more a question of mechanical parts. You need a very precise machine, in other words, and this is not a parameter where price goes down so much with time.

I do not really see the point to have this in a private practice; it is more a tool for a lab. Comparison with a 2D printer does not hold on this one because 2D printers are used for not-so-precise printing. ■

DEC 18 2013

dcash

Member Since: 11/11/04

Post: 4 of 16

Interesting timing as I'm just in negotiations for the Objet 30 (or "ortho desk") as we speak. You can get it for about \$42,000 but there are some software and warranty packages that get a little spendy.

Also the epoxy is expensive, but there are some cost saving techniques to keep things manageable ("hollow" models, etc.). I'm going to pull the trigger for sure by early spring. I'll do a posting after the install and training if anyone is interested. ■ DC

DEC 18 2013

Dr-T

Member Since: 05/19/09

Post: 5 of 16

I just had time to watch the MakerBot video. They state 100 micron resolution. That sounds pretty impressive if they can actually live up to their advertisement. I believe these will eventually replace Invisalign as we will be able to make in-house aligners from an intra-oral scan not too far off into the future. ■

DEC 18 2013

ilovebraces

Member Since: 08/21/11

Post: 6 of 16

Dcash, are you purchasing the Objet 30 for use in your own office or for adding model printing to Cx Orthodontics Supply services? ■

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orthothai

Member Since: 10/14/13

Posts: 7 & 8 of 16

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3D Printers

Resolution is the size of your voxel; it will be low on every machine. What you should be looking for is *precision*, meaning how well the different voxel are positioned in relation to one another. This is the difficult part and why the medical or factory-grade machines are so expensive.

Here. For your machine they state:

Positioning Precision

XY: 11 MICRONS [0.0004 inches]

Z: 2.5 MICRONS [0.0001 inches]

This is very good. In fact this is so good that I have serious doubt about this figure. Making mechanical parts moving with such precision is perhaps possible but would be very expensive.

Here's a link toward specification of medical-grade 3D printer. *[Editor's Note: Visit this message board on Orthotown.com to view the link.]*

Two years ago the price was around \$200,000 for this one and it is used in dental labs. Precision is between 20-88 micron for small detail and 200 micron for full object (the bigger the object the more deformation you will have).

I know that technology progresses fast but I have serious doubt that the price was divided by 100 and the precision multiplied by 10 in two years. And once again, the precision part is a mechanical issue, nothing to do with computer power, so the price will not go down so much. Does not matter if you move a laser (stereolithography) or a printing head when you want this degree of precision, you need very precise manufacturing – no way to go around this one.

For \$2,000, you will have a machine suited for printing toy, decoration or prototype, but nothing more. If you want to use this technology to print arcade and make aligners on them, your best bet is still to outsource the 3D printing part.

By the way, the company who makes the Biostar machine offers this service: The sell you the software for making your sequential set up (basically let you move the teeth by 0.5 mm at each step), you can then print your different step and use a Biostar machine for making the aligner. Printing the aligner directly cannot be done yet.

[Posted: December 18, 2013]

Same question as the other: What use do you see for the Objet 30 in your office? I was very interested two years ago about 3D printing but after speaking with someone in this sector I came to the conclusion that having a printer in the office would not make real sense. For small quantities, it's better to outsource the production. Even for my father's company, which uses the technology quite a lot, the volume involved was not sufficient to justify the acquisition of a printer. ■

DEC 18 2013

dcash

Member Since: 11/11/04

Posted: 12/18/2013

Post: 9 of 16

No current or future plans to use this with Cx Orthodontics. Just my own office. We can do up to 20-30 retainers per day (fairly busy practice but also 20 years of patients losing/wearing out retainers). I really like the idea of a no alginate/minimum plaster practice. ■

DEC 18 2013

orthothai

Member Since: 10/14/13

Post: 10 of 16

So you plan to take digital impressions, print the impressions and then produce the retainer with a Biostar-like machine? And the Objet 30 can manage to print such quantity daily? I was under the impression that the printing was quite slow and the machine prone to mechanical failure. This is not specific to this machine – this is a common feature of the 3D printer.

This last point was one of the reasons why my father's factory did not make the investment; trouble was, even with a good maintenance contract, when the machine is out of service you have to outsource again or stop working. ■

DEC 19 2013

dcash

Member Since: 11/11/04

Post: 11 of 16

You can do about 25 horseshoe arches in one "run." Takes about four hours from what I gather. So my thoughts are one in the a.m. and one in the p.m. would probably work fine.

We typically give our debond patients same-day retainers, so might have to change that up a bit.

The scanner I'm looking at is 3M True Definition. Cost is \$12,000. So you can get into it for about \$60,000 total, which I'm ok with. The problem is the scanner side monthly is \$200+ for data storage and transfer (allows open STL files) and the 3D printer side has maintenance fees also. ■ **DC**

DEC 19 2013

Here (Southeast Asia), this kind of use makes no sense yet. The price of labor is quite cheap and we cannot sell the retainer for the same price as in the U.S. But other uses quite similar for the production side would already make sense even here. Printing of arches for movement sequence for Invisalign-like treatment, among other things. I hope you will keep us informed of you experience if you decide to go through.

As explained previously, the price of the printer for medical-grade application will probably not go down significantly in the near future due to the limitation to produce, assemble and maintain high precision machine.

In one of the 2012 AAO meetings, one of the speakers about 3D printing made a parallel with the first color printer, which was costing more than \$5,000 when the movie Wall Street was shot, and that are now cheaper than buying paper and ink cartridge. His conclusion was that 3D printers would soon be in every office. Only trouble, of his own admission, was that one of the AAO requirements for treating this topic was to know nothing about this subject when applying for doing the presentation (I am not joking on this one).

The price for high-precision stereolithography machine never went significantly down when they have been around for quite some time, for exactly the same reason. On the other hand, and if you want low precision unit you can find them quite cheap, you can even fabricate one yourself.

Hope to hear news about your experience soon. ■

DEC 19 2013

Doesn't Invisalign just use stereolithography to print the trays directly? If you scan the arches and can print the Essix trays, why do you need the model? For boards? I don't understand. ■

DEC 19 2013

No, Invisalign prints the arches and makes the tray with Biostar-like machine. An aligner tray must have very specific properties, mechanical and chemical, and no printable or stereolithographic material came close at the present time. The only direct printing is for surgical guides, where the only requirement is rigidity and non-toxicity. ■

DEC 19 2013

This is an Italian company that reports milling retainers direct. Optimally that would be my ultimate goal and not to have to deal with models at all. With my limited research, I haven't seen a set up that can accomplish this that doesn't look like it's in very early stages of development. ■

DEC 20 2013

orthothai

Member Since: 10/14/13

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Braces101

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