

# SMART ORTHODONTICS

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## Orthodontics related gadgets

### Smart products

Diagnostic tools

Orthodontic Apps

Decision making process

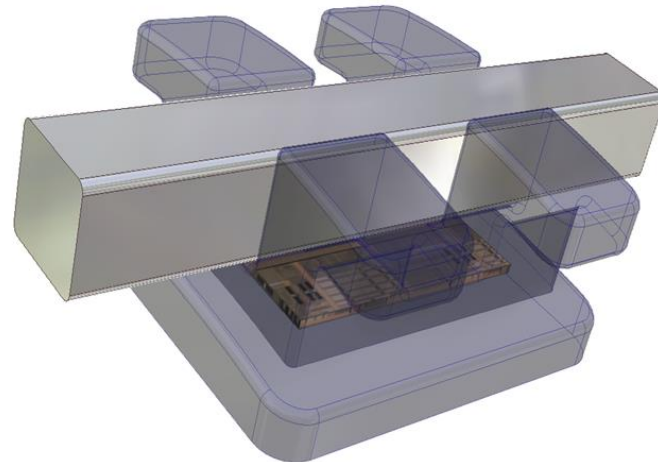
Bracket system

Smart technique

Treatment protocols

Aesthetic consideration

## Smart brackets



Integrate CMOS sensor chips in fixed orthodontic appliances.

Lapatki and Paul, 2 0 0 7

Improved smart brackets with wire-mediated energy transmission could be applied in the near future in orthodontic.

Improving the force measurement accuracy and integrating components for telemetric energy and data transfer are the next steps towards clinical application of intelligent orthodontic appliances based on smart brackets.

Rues et al., 2 0 1 1

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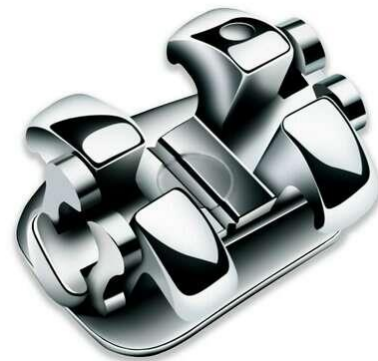
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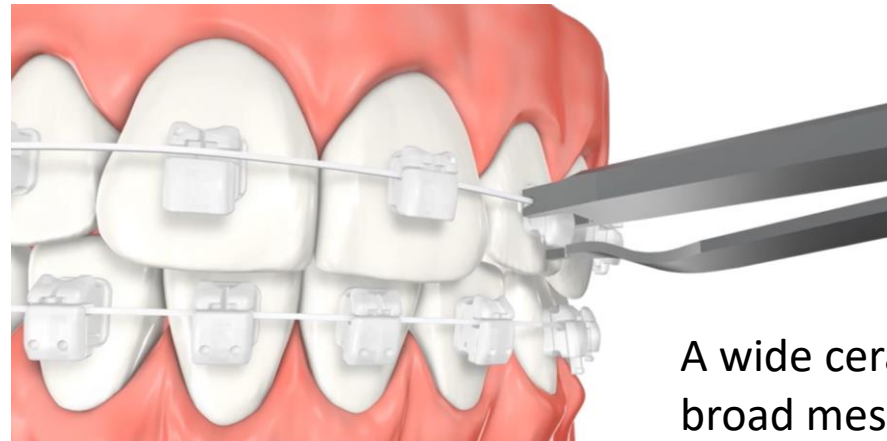
Aesthetic consideration

## Smart brackets



Smart clip

"Intelligent" clips that release the archwire if forces are excessive



Force



A wide ceramic door assists rotational control with a broad mesial-distal span.

Passive selfligating bracket becomes active on-demand

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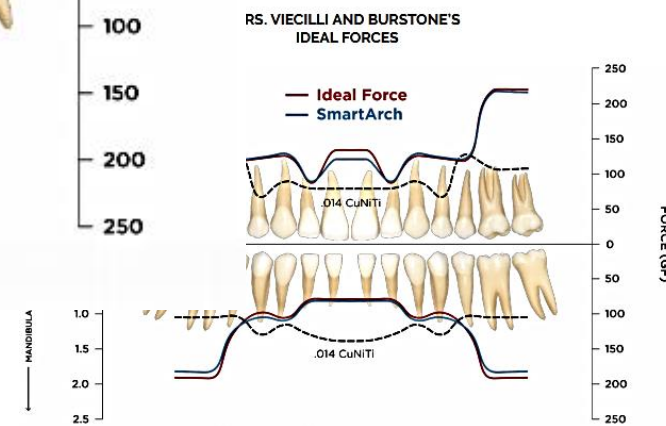
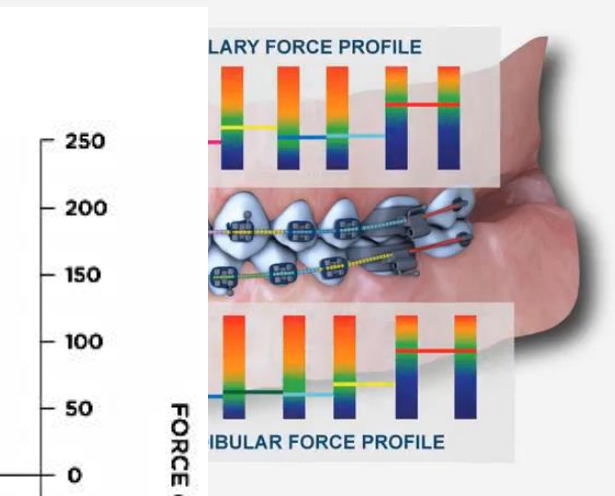
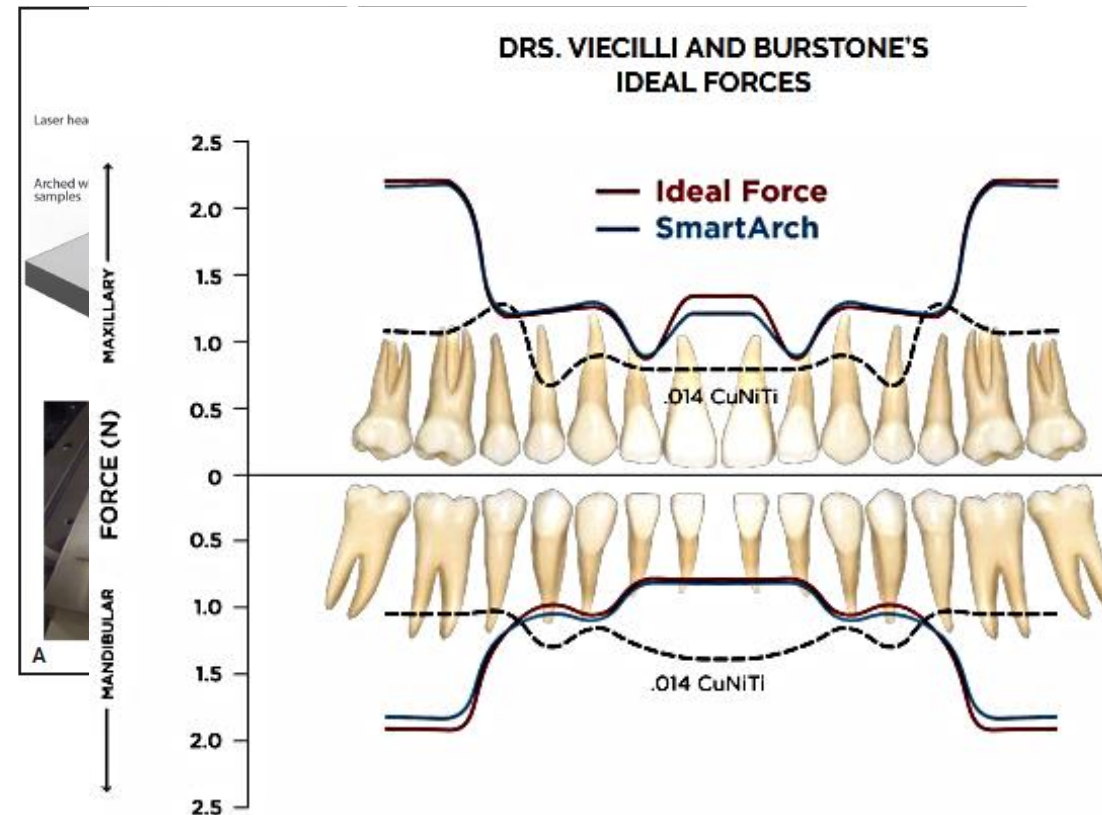
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## Smart wires



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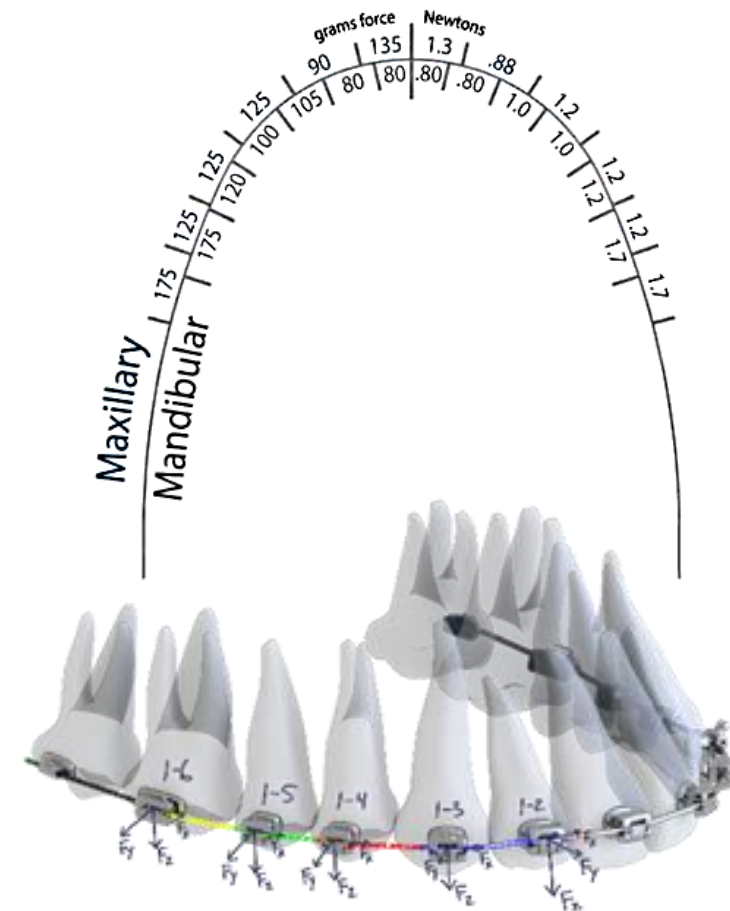
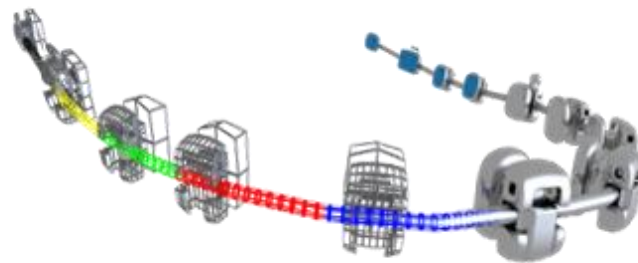
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## Smart wires

laser-conditioned CuNiTi wires with a differential force profile that is based on the optimal compressive stress in the periodontal ligament (PDL) to achieve rapid tooth movement with minimal necrosis.



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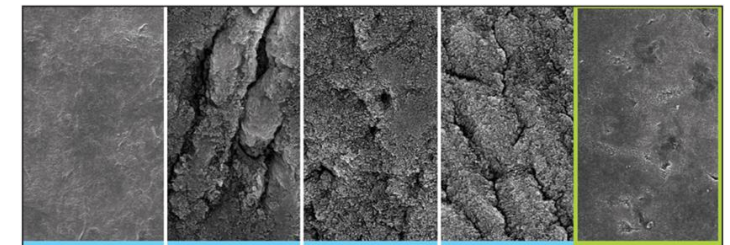
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## Smart adhesive

### Etch Free bonding

moisture-tolerant primer that bonds ionically to enamel. (a catechol-modified methacrylate (for wet adhesion), hydrophilic monomers (e.g. HEMA), and a compatible solvent (ethanol/water).



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## Smart implication



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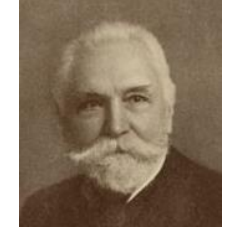
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## Smart retainers

The success of orthodontia as a science and an art now lies in the retainer. Norman Kingsley, 1908



Tracking device to help parents and orthodontists monitor retainer use after braces are removed.



# Smart Orthodontics

Orthodontics related gadgets

## Generative AI and metaverse in education

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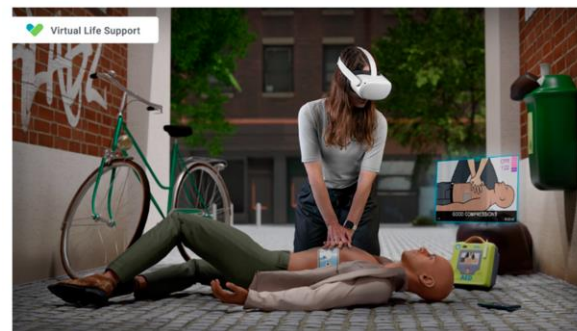
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(a)



(b)



# Smart Orthodontics



Orthodontics related gadgets

## Genetics-based orthodontic prediction

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An emerging field that uses an individual's genetic profile to forecast craniofacial growth, tooth movement speed, and treatment complications.

Review Article

Orthodontics

### **Precision Orthodontics: How Much Can Genomics and Gene Therapy Help?**

Ranjana Ravindran<sup>1\*</sup>, Roopesh Ramakrishnan<sup>1</sup>, Deepu Leander<sup>1</sup>, Madhav Manoj K<sup>1</sup>, Ravindran Ankathil<sup>2\*</sup>

<sup>1</sup>Department of Orthodontics, PMS College of Dental Science and Research, Kerala University of Health Sciences, Kerala, India

<sup>2</sup>Human Genome Centre, School of Medical Sciences, Universiti Sains Malaysia, Health Campus, 16150, Kubang Kerian, Kelantan, Malaysia



# Smart Orthodontics



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## Genetics-based orthodontic prediction

Genetics-based orthodontic prediction is an emerging field that uses an individual's genetic profile to forecast craniofacial growth, tooth movement speed, and treatment complications.

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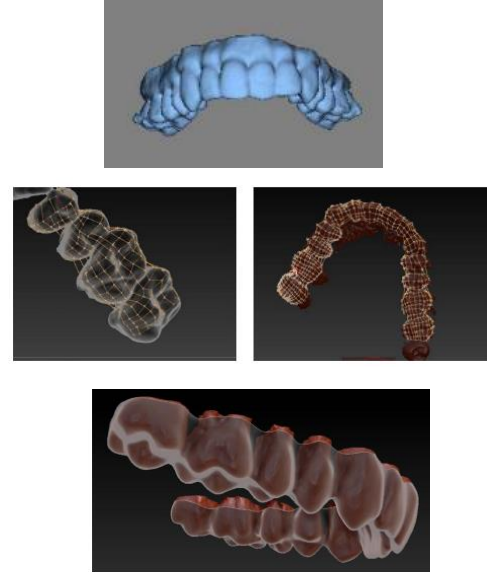
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## 3 D virtual model and scan



Fine Polyamide PA 2 2 0 0 (EOS)



The 3 D-printed retainers seem to be similar to the traditional vacuum-formed retainers in fit. (Cole et al., 2 0 1 8 )

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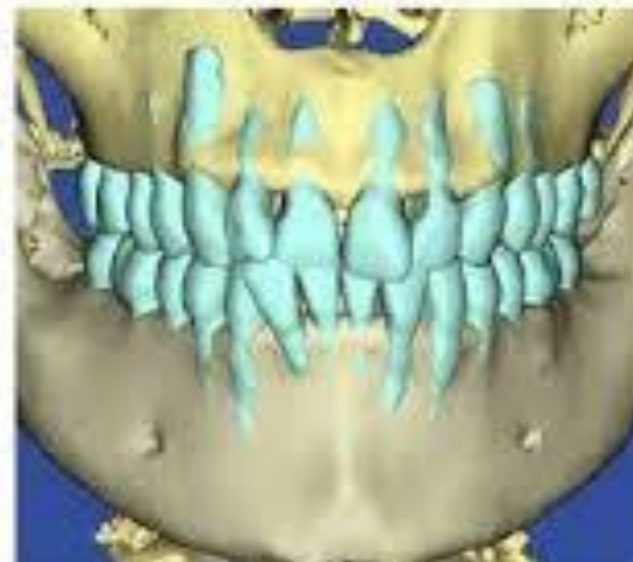
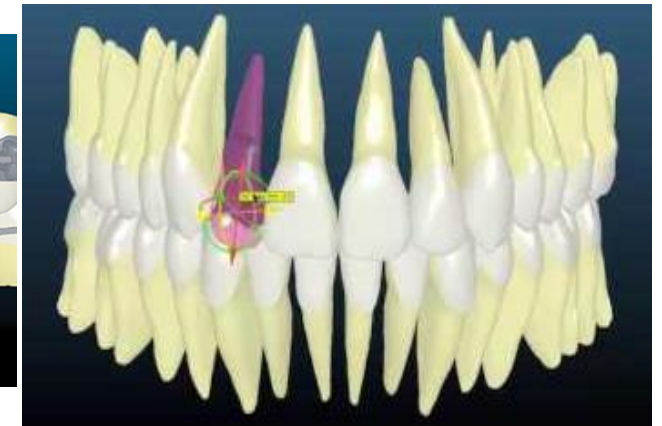
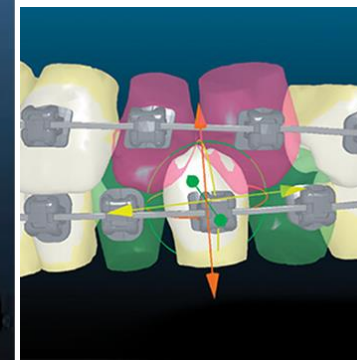
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## Orthodontist related APPS

**Kevin O'Brien Bolg**



**Brunch time  
form brain**

Archives

*Fact Check*

OCTOBER 12, 2020

FACT-CHECKING SOME KOLS...

READ MORE



A wise man once told me 'if in doubt, don't extract'. I was therefore interested in reading this new clinical trial. This looked at whether we should remove two primary teeth (canine and first molar) to improve the eruption of ectopic palatally-displaced canines (PDCs).

We have seen a welcome improvement in our evidence base relating to interceptive management of ectopic canines in recent years. Much of this research has emerged from Scandinavia. This interesting paper builds on this work. A relatively recent trial using a contemporary methodology and three-dimensional imaging by [Nauomoya and colleagues](#) has helped to re-affirm the earlier work of Ericsson and Kuroi. This suggested that the removal of primary canines may improve the position of ectopic permanent canines.

Currently, clinicians propose a wide array of more invasive alternatives to improve the position (and indeed produce independent eruption) of ectopic canines. These interventions include adjunctive use of transverse expansion, arch enghthening with cervical-pull headgears and re-opening of an excess of space with fixed appliance. In addition to the removal of first primary molars primary canines. They base these techniques on the potential benefit of space creation in encouraging favourable movement of the canine. By and large, these more invasive approaches have demonstrated equivocal benefit.

A team based in northern Norway did this study. The Angle Orthodontist published the paper. I have yet to visit northern Norway; however, my children continue to suggest that we go there some time!

**Very good appraisal for articles.  
Be careful .....**

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**Smart tooth**

Enter width or length of maxillary central incisor:

TOOTH CALC   WIDTH/LENGTH   IDEAL WIDTH

1	2	3
4	5	6
7	8	9
.	0	✕

MILLIMETERS

CURVE OF SPEE FACTOR

Right   Left   0.5 ALD

UPPER   LOWER

1	2	3
4	5	6
7	8	9
.	0	✕

Analysis Results

**MESIAL-DISTAL WIDTH**

TOTALS	UPPER	LOWER
5 - 5	-	-
6 - 6	-	-
3 - 3	-	-

**ARCH LENGTH DISCREPANCY (ALD)**

MAXILLA	MANDIBLE
-	-

**TOTAL ALD - CURVE OF SPEE**

MAXILLA	MANDIBLE
-	-

**BOLTON'S ANALYSIS**

ANTERIOR RATIO	TOTAL RATIO
-	-
TOTAL RATIO	EXCESS
L6 - 6	-

SHARE RESULTS >

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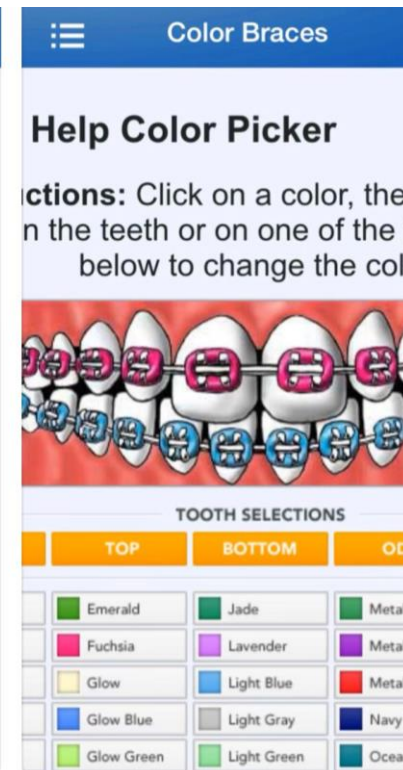
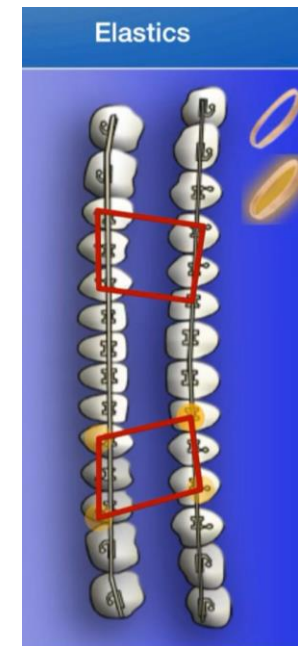
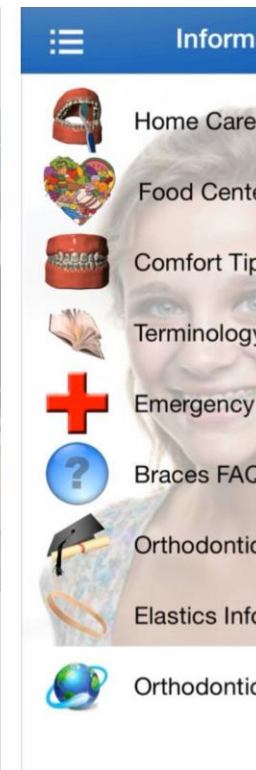
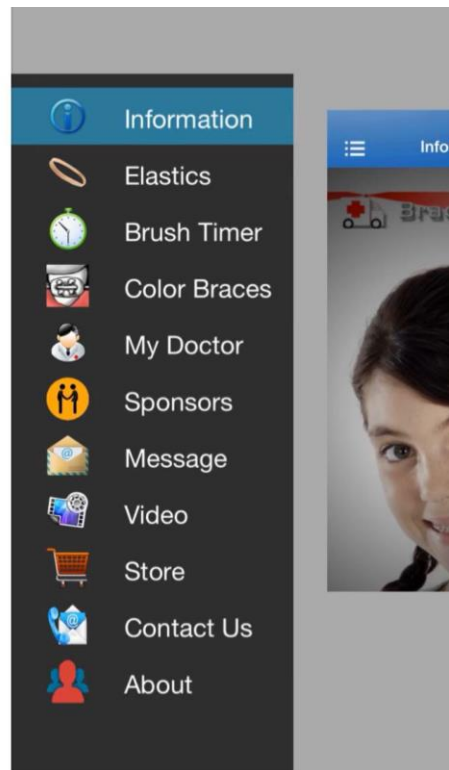
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## Patient related APPS



**Braceshelp**



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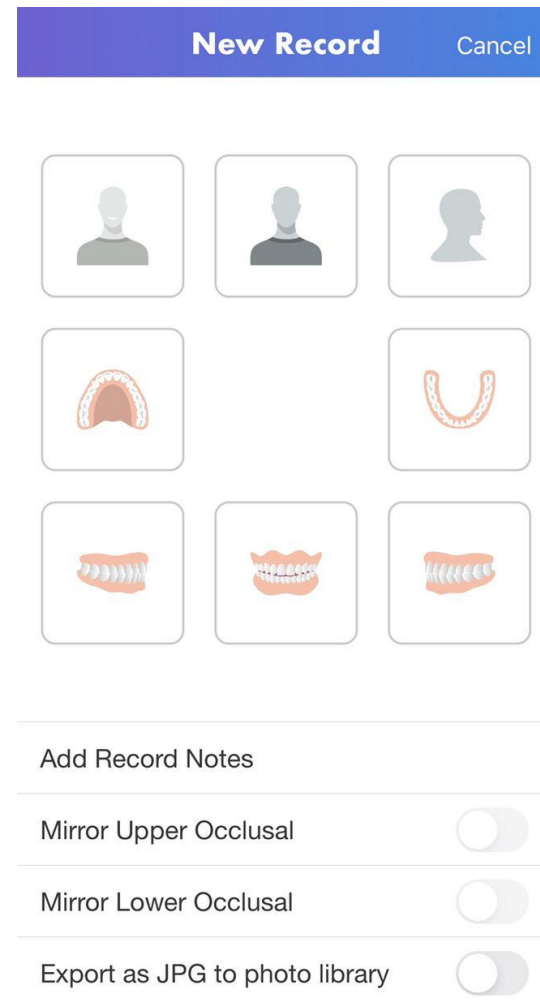
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## Orthodontist related APPS



Create your “carry-on” studio and keep tracking the patients.



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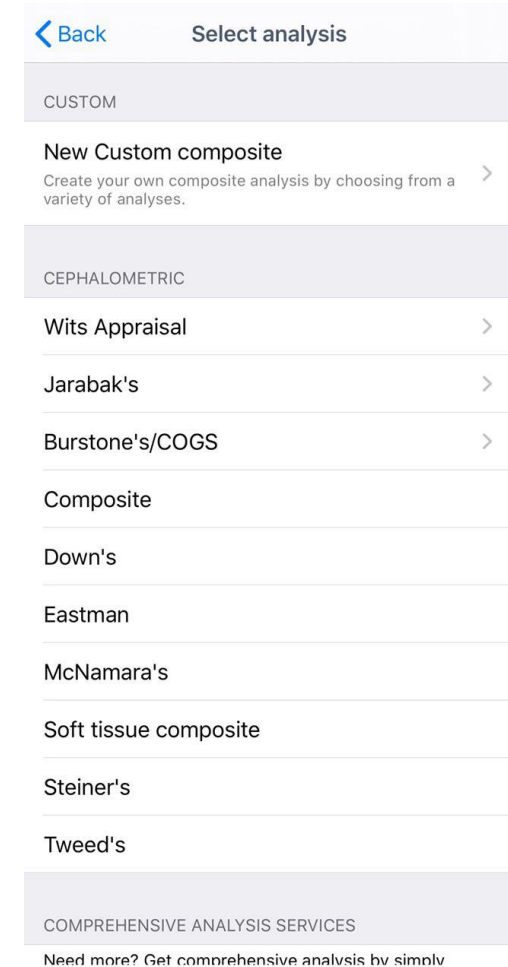
Aesthetic consideration

## Orthodontist related APPS



**CephNinja**

- [New analysis](#)
- [Add photographs](#)
- [Add progress notes](#)
- [Add 3d models](#)
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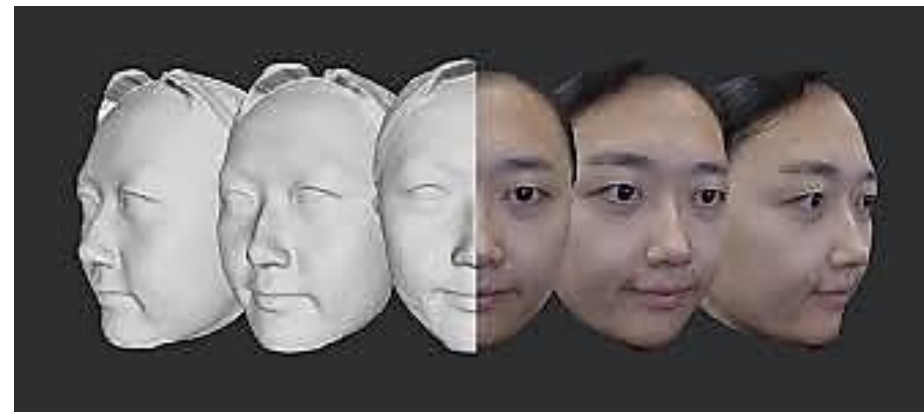
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## Patients?? related APPS



**Bellus 3 D**



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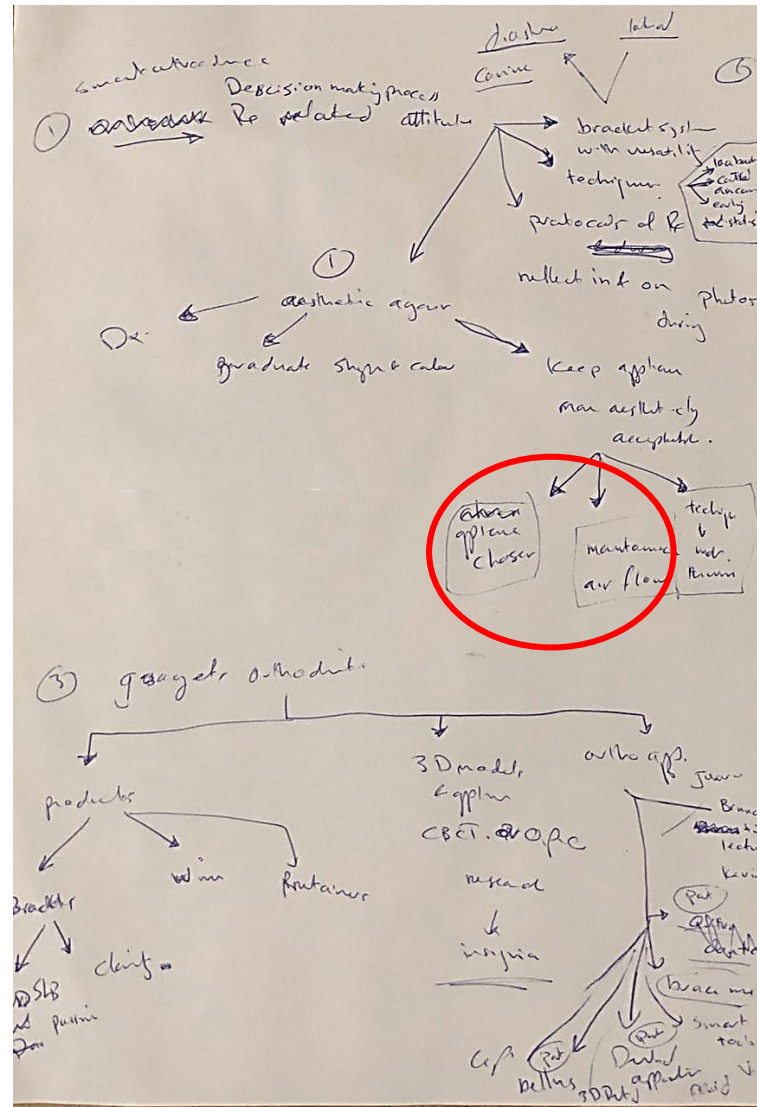
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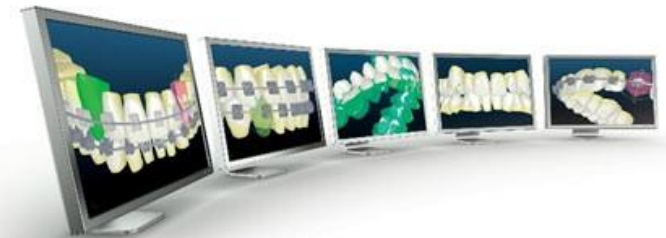
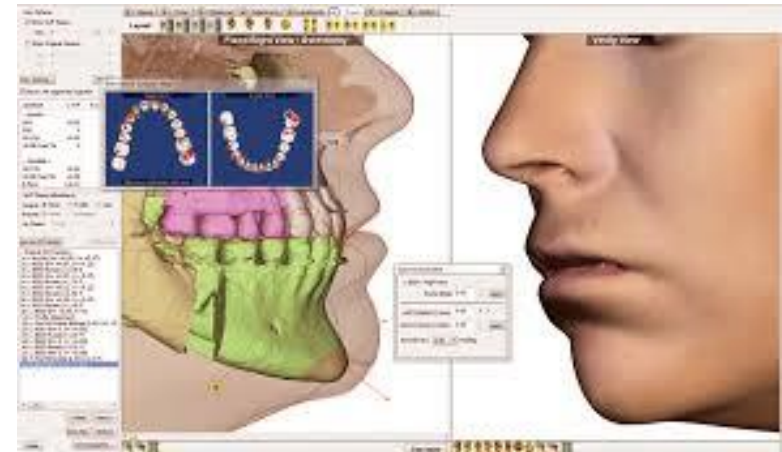
## Aesthetic consideration

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### Face-driven appliance

Embrace appropriate torque

Custom made appliance



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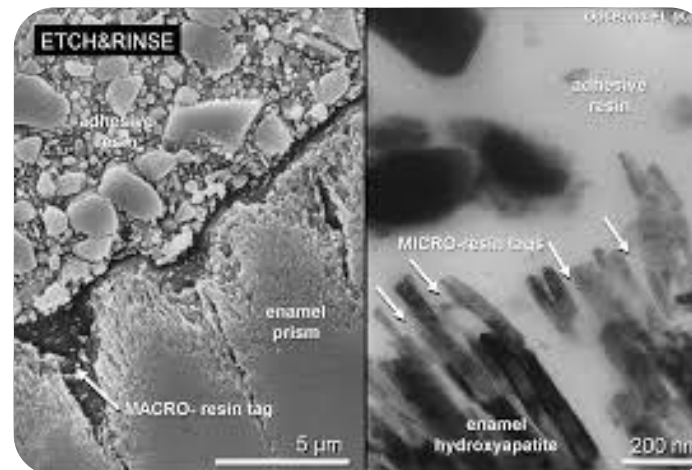
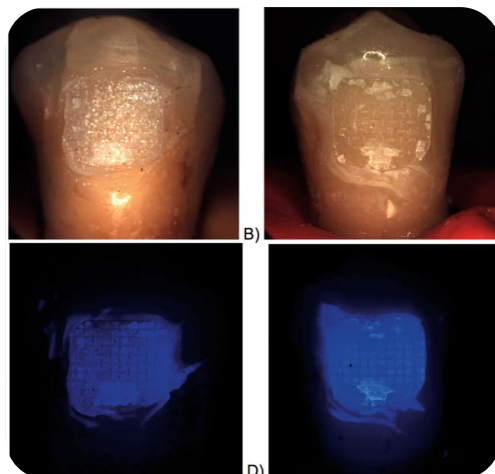
**Aesthetic consideration**

## Bleaching and Maintenance

Professional bleaching and resin tag removal

Opalescent tooth paste

Periodic professional oral hygiene follow up



**Knowledge is a process of piling up facts;  
wisdom lies in their simplicity (Fischer)**

*Thank  
you*

