On the Safe Side:

Improved curing – thanks to Autofocus

Achieving the best possible polymerisation of light-cured filling and bonding materials in the mouth is of vital importance to ensure the durability of a restoration.

With the new Mini L.E.D. Autofocus, Satelec (Acteon Group) presented its third generation of LED lights at this year's IDS. After the sensational launch of its Mini L.E.D., Satelec's new high-power light sets another milestone - with the world's first auto-focus function which automatically calculates the precise exposure time required – irrespective of the position of the lamp.

The Mini L.E.D. Autofocus is the first to 'automate' the clinical process of polymerisation. Based on a complex telemetry system and an innovative microprocessor, the 'active system' constantly calculates the ideal power density required for curing a layer two millimetres thick (for all popular light-cured materials).

With an output greater than 2,200mW/cm2, the Mini L.E.D. Autofocus is currently the most powerful LED light available. This exceptionally high light intensity, combined with a 100% light spectrum, enables dentists to achieve extremely rapid curing without generating heat. Power can be perfectly controlled with three different curing programs: standard mode, pulse mode and soft start mode

Contact your Gunz Dental representative for more information or call our customer service team on 1800 025 300.

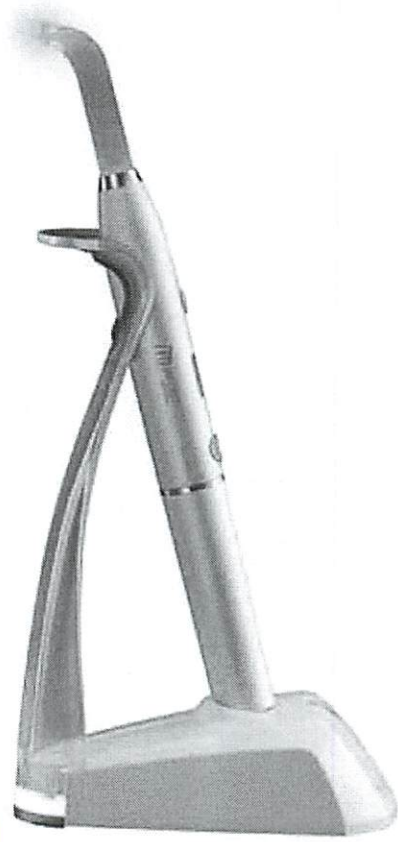


Fig 4: *The miniLED autofocus by Acteon-Satelec*

Third Generation LED lights *by Dr Pelissier*

The features of the LED lights are:

- **High power of more than 1000mW (therefore a density ranging from 2200 to 3000 nW/cm2 without multiplying factor, which means an average density power 2500nW/cm2)**
- **A spectrum centred around 450nm in order to cure composites at 400 and 480nm**
- **A very straight-forward design, with 3 customisable or preset modes thanks to an autofocus automatically regulating time based on the amount of energy received by the composite: fast curing mode (8 seconds on average at full power), ramping mode (10 seconds from 0 to 100% and 10 seconds at full power), pulse mode (10 times 1 second)**
- **A minimal temperature increase allow ing a very long continuous use (up to 200 shots of 10 seconds); this light is very quiet (no fan)**
- **A high capacity battery (250 shots of 10 seconds) and without memory effect (3.6V, 2400mAh and Li-Ion) (great autonomy and recharge in 2 hours)**
- **Small size (26cm x 2.4cm optical light guide included, light (160g with guide) and easy to use (cordless)**

Over the past ten years, a variety of new light curing modes (including ultrafast mode, ramping mode, incremental mode and pulse mode) as well as a wide range of materials have been proposed as solutions to clinical challenges that occur as the result of lengthy procedures and the unavoidable shrinkage of composite resins.

Both direct and indirect clinical treatments can be undertaken using second generation LED light curing *(Fig 1 and 2)*. LED technology superseded ultrafast light curing which had resulted in numerous debates and led to the publication of articles which often contradicted each other (sudden polymerisation, questions regarding restorations leaking, curing times too short, etc.).

If we part from the premise that second generation LED lights are the equivalent of halogen lights, then the third generation LED lights are - as we will demonstrate - a true revolution. Not only are they equal to the best curing lights - be it LED; halogen or plasma - but they also introduce new clinical possibilities.

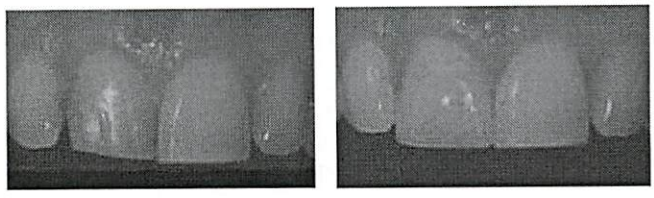


Fig 1: *Direct anterior layering (Dr. Bernardou / Dr. Pelissier) (Gradia Direct® composite) and Satelec Mini LED light)*

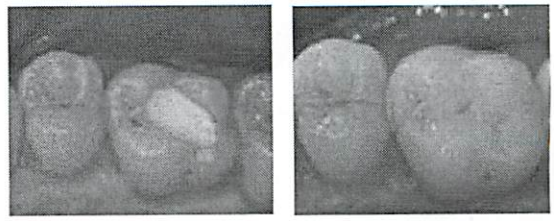
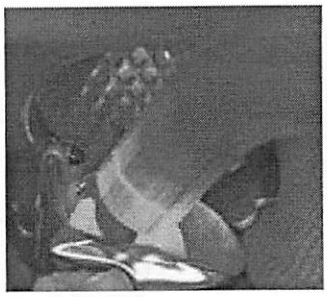


Fig 2: *Composite Inlay (Dr. Castany/Dr. Pelissier) (Variolink II® cement and Satelec Mini LED)*



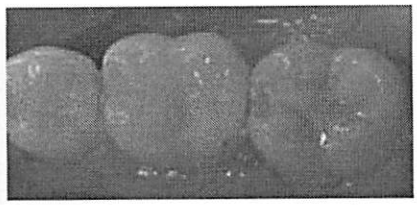


Fig 5: *(Left and above) Ceram X restoration on tooth 36 and light curing with Satelec MiniLED autofocus*

Third generation LED lights bring together all the essential elements by offering:

- a wide spectrum, identical to halogen lights, but without using high- or low-pass filters (from 400 to 500 nm in average)
- a power of more than 1000mW, superi or to that of plasma lights (corresponding to almost 3000mW/cm2 with a standard light guide)
- preset time/power profiles, that is, 'fast curing' menu (the short exposure of 3 to 5 seconds is particularly well suited for the layering technique or for whitening), 'pulse mode' which allows breaks over 8 or 10 seconds of pseudo fast curing (as in LASER polymerisation), and of course, the traditional method 'soft curing' which allows practitioners to use their light over a longer time with a modulated power (for example 20 seconds with only 50% of the nominal power, which has the consequence of not using the battery quickly, even though the exposure time is longer).
- A high capacity battery (thanks to the ongoing advancements in mobile phone technology!), with usage time close to 15 days, with no increase to the weight of the light.

The 20 years' of 'specialist' experience required to ensure the successful use of LED light is indeed a thing of the past!

In this instance comparison between third generation LED lights with plasma lights was not possible. However, we do not regret the struggle between technologies which we have led in the interest of our profession since 1998.

In addition to the specifications listed above, light guides boast functions which are unique to this third generation. The role of a light guide at the extremity of the curing light is very important, 'guaranteeing' the transmission of power from the light source, enabling the setting reaction. Considering that this reaction is characterised by the activation of a photo initiator, it is evident that the function of the fibre is to facilitate the transport of a wave with maximum energy and with the right wavelength, to the initiating molecule which consists generally of camphorquinone (CQ: reaction peak of 465nm) and occasionally other molecules such as phenyl-propanedione (PPD: reaction peak of 390nm).

We all know that photon density diminishes the closer we get to the periphery of the light halo; therefore the effective power of the light also diminishes considerably (Fig 3). The same is true when the distance between the light guide and the surface to be light cured is large. At any time there is a risk of under- or over-polymerisation, and possibly both, if the light beam is not oriented properly or not controlled properly.

The new-generation LED lights, thanks to the development of sophisticated electronics, enable control over these factors, by indicating where the nominal power of the light is situated (the value referred to in the brochures) and by automatically modulating the time of light exposure depending on the true power which the composite is being subjected to: the closer the light is, the shorter the exposure time, and vice versa.

The polymerisation reaction of composites occurs in the same way following photochemical initiation, regardless of the light source in use. The final polymerisation achieved depends on the absorption spectrum, the light intensity, the duration of the light beam, the thickness and the shade of the composite. All of these factors are common to the various lights (halogen lights, high energy lights or LED lights). The third generation LED light, for the first time in the history of curing lights, appears to be superior to all previous generations. The clinician is able to adapt the curing mode either to the material, or to the technique, with one single light - this should put an end to the 'which light/technique' debate! Efficiency was achieved by second generation LED lights. Amongst this second generation we can find a dozen more or less well-known brands. In alphabetical order we will mention Bluephase® by Vivadent, Freelight 2® by Espe 3M, L.E.Demetron by Kerr, MiniLED® by Satelec, and other ones which may or may not be available on the French market.

For this study, we had available to us at the Montpellier Dental Faculty the first light (prototype) of the third generation: the miniLED autofocus by Acteon-Satelec *(Fig 4)*. Clinical cases were treated using both direct and indirect technique *(Fig 5)*.

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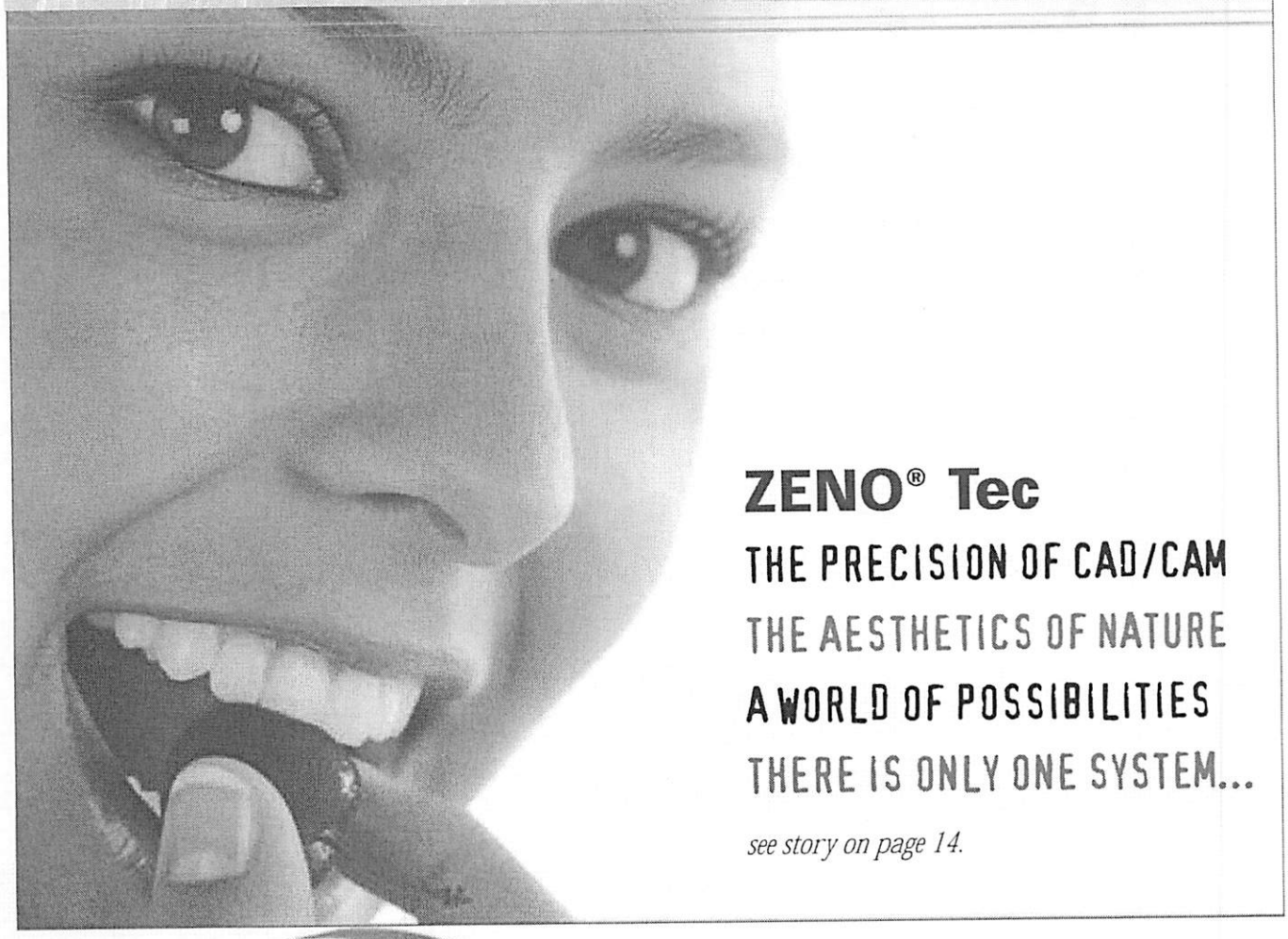

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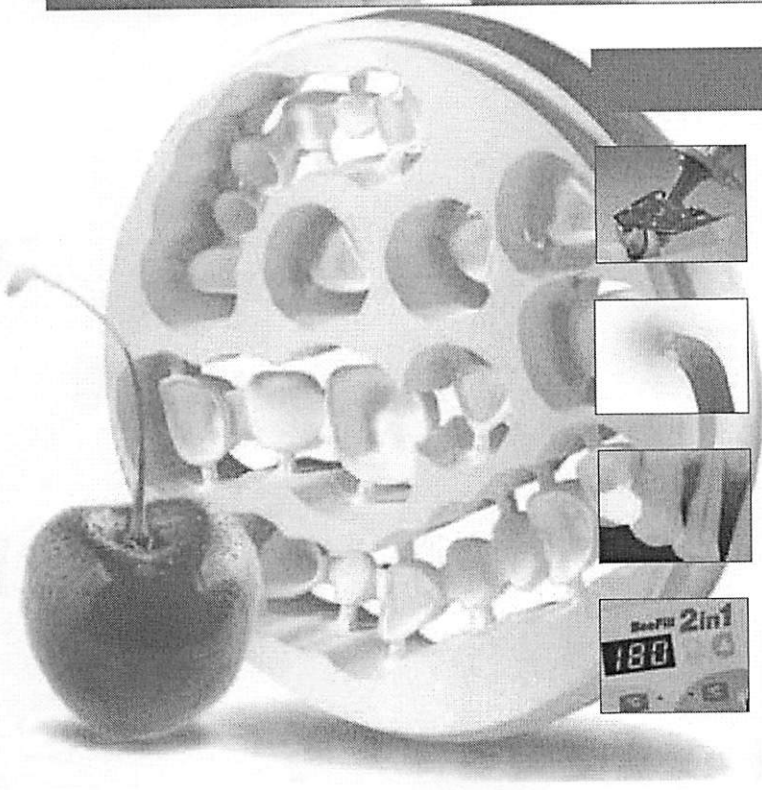

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Après lecture, je comprends mieux
Cdlt
François

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> >
> > Ci joint le journal paru avec l'article en GB.
> > Pardon mais c'était vraiment un oubli de ma part!!!
> > Cdlt,
> > sandra
> >
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> > Vous avez du m'en envoyer une copie mais elle ne m'est pas parvenue...
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> > Cdlt,
> > François Duret
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> > > Bonjour,