SUPPLEMENTARY TEXT

**Verifying the results (Supplementary Figure 1)**

As this experimental set up creates a static force system, it should abide by the **laws of equilibrium**. In other words, the sum of all the forces and moments on the archwires in any given plane should be equal to zero.

Mathematically the equilibrium equations for the experiment can be stated as:

Σ $\vec{Fz}$ = 0.

Also, Σ $\vec{Fz}$ = $\vec{Fz}$(m) + $\vec{Fz}$(i)

Σ $\vec{M}$*X*=0

Σ $\vec{M}$*X*= $\vec{M}x$(m)+ $\vec{Mx}$(i) + $\vec{M (}$ $\vec{Fz}$(m) or $\vec{Fz}$(i) x D)

Here,

Σ $\vec{Fz}$ = Sum of the forces in the vertical direction (z-axis).

$\vec{Fz}$(m) = Vertical force on the molar bracket

$\vec{Fz}$(i) = Vertical force on the incisor bracket

Σ $\vec{M}$*X*= Sum of the moments in the transverse dimension (x-axis).

$\vec{M}x$(m)= Transverse moment on the molar bracket.

$\vec{Mx}$(i)= Transverse moment on the incisor bracket.

$\vec{M }$= Moment created by the vertical forces at each bracket.

D = 29.5 mm (Distance between the molar and incisor brackets)