

*Fig.1 The flow of real-time estimation for pigmentations.*

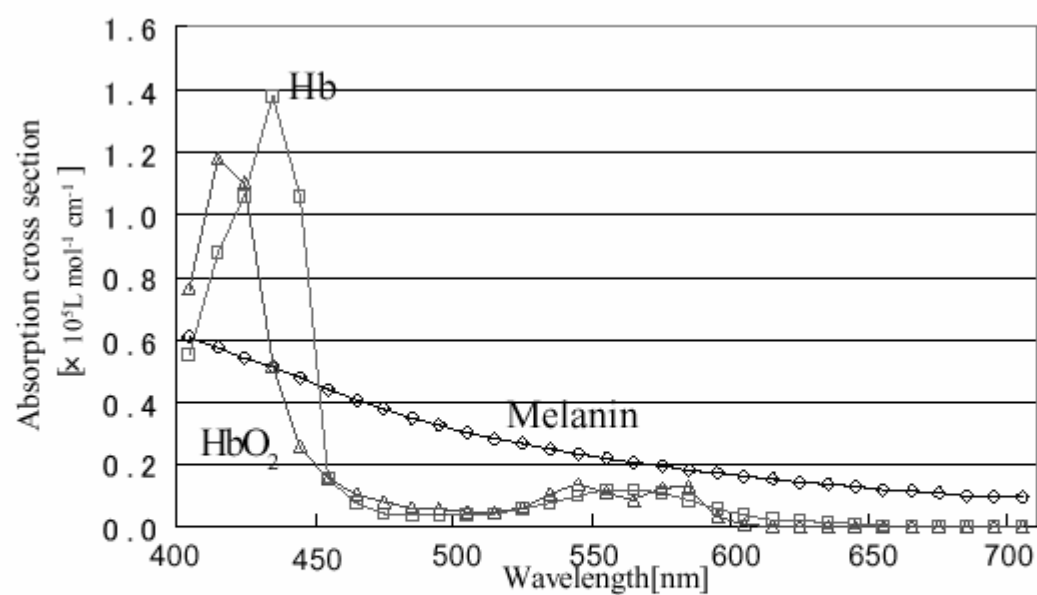


Figure 2. Absorption cross section of melanin, oxy-hemoglobin( $\text{HbO}_2$ ), and deoxy-hemoglobin( $\text{Hb}$ ).

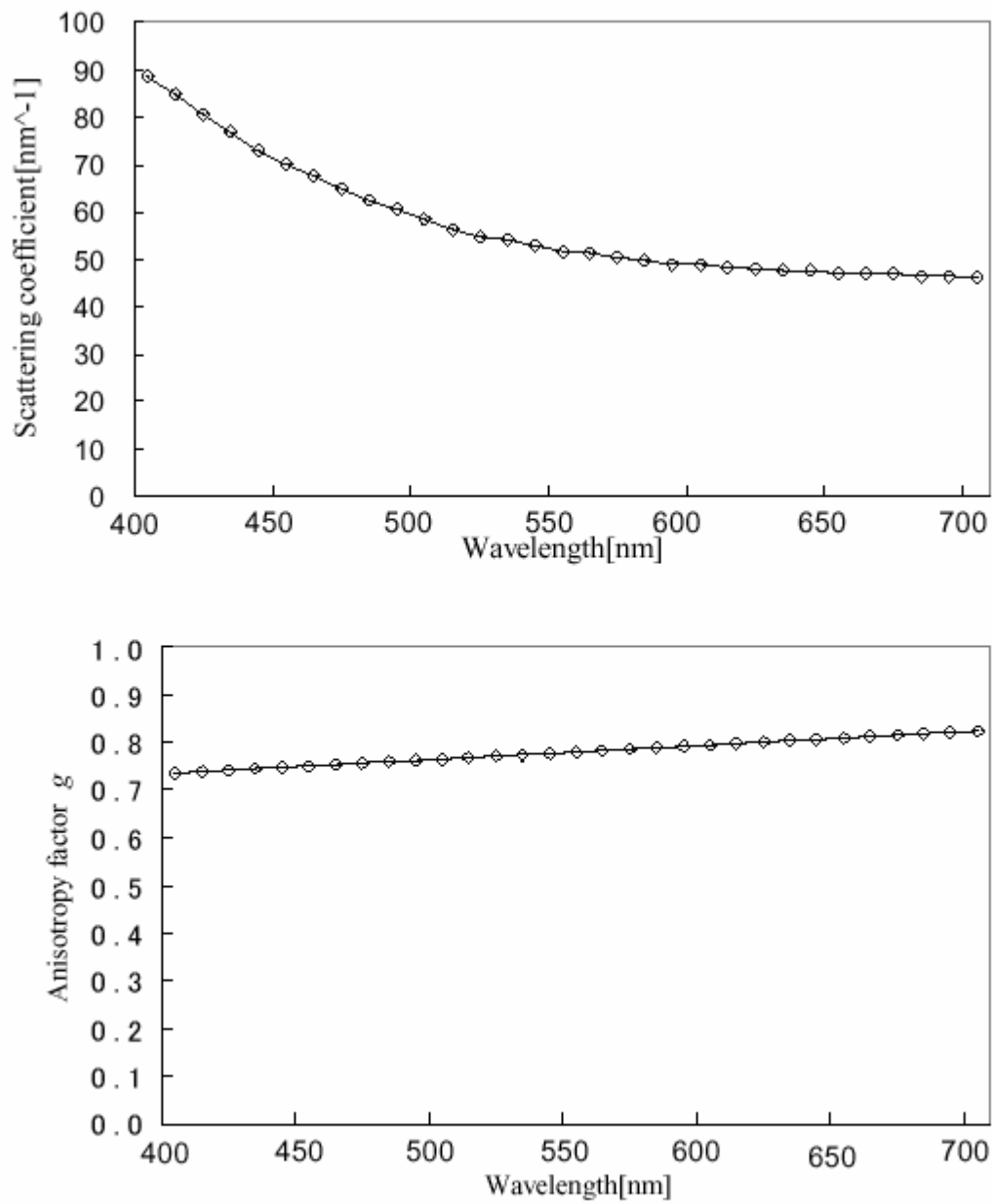
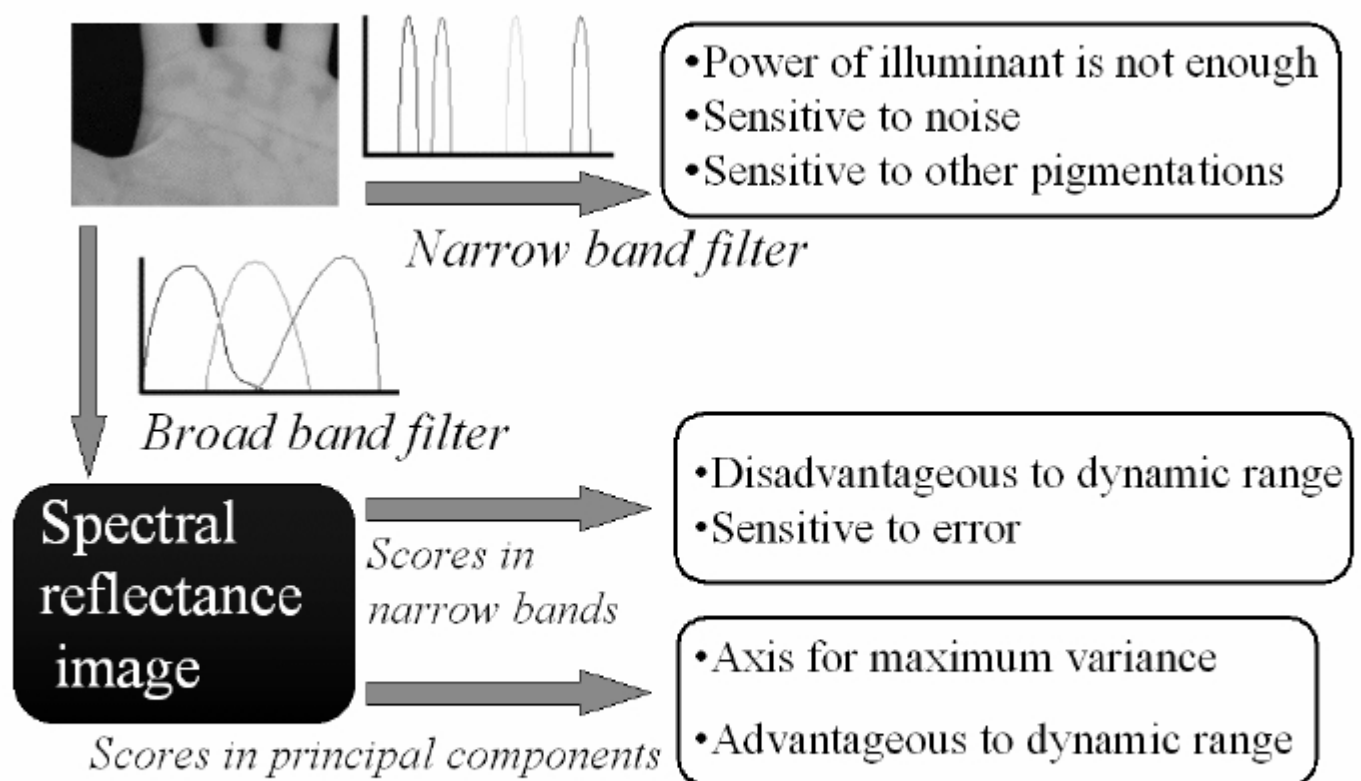
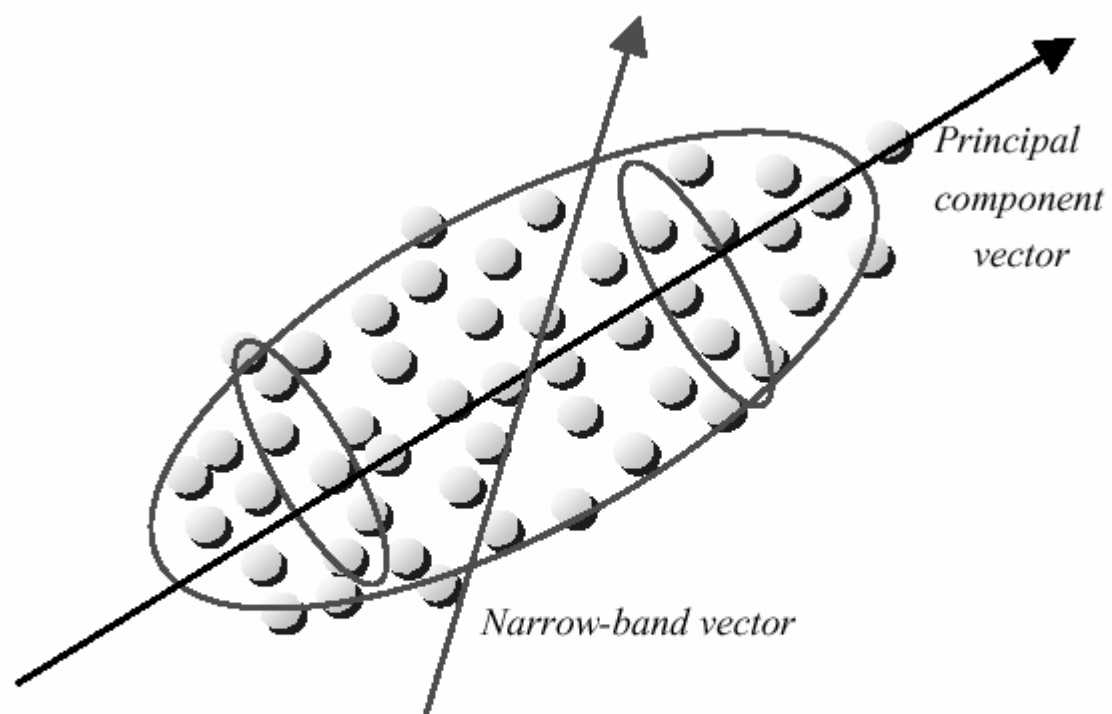


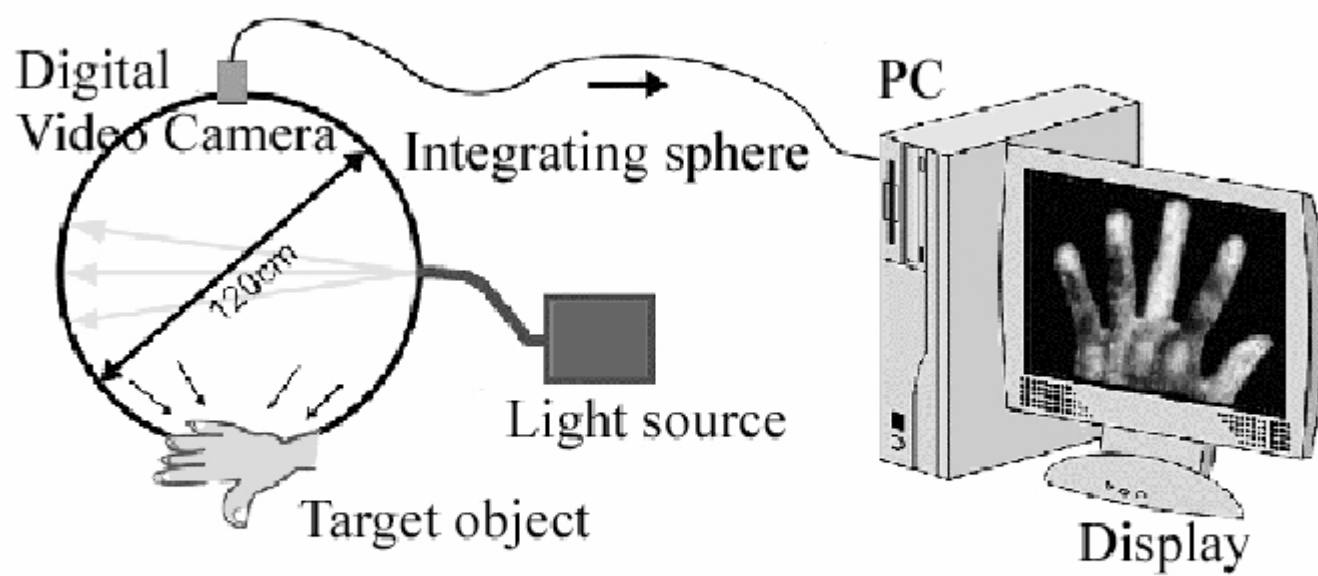
Figure 3. Scattering coefficient and anisotropy factor in epidermis and dermis layer.



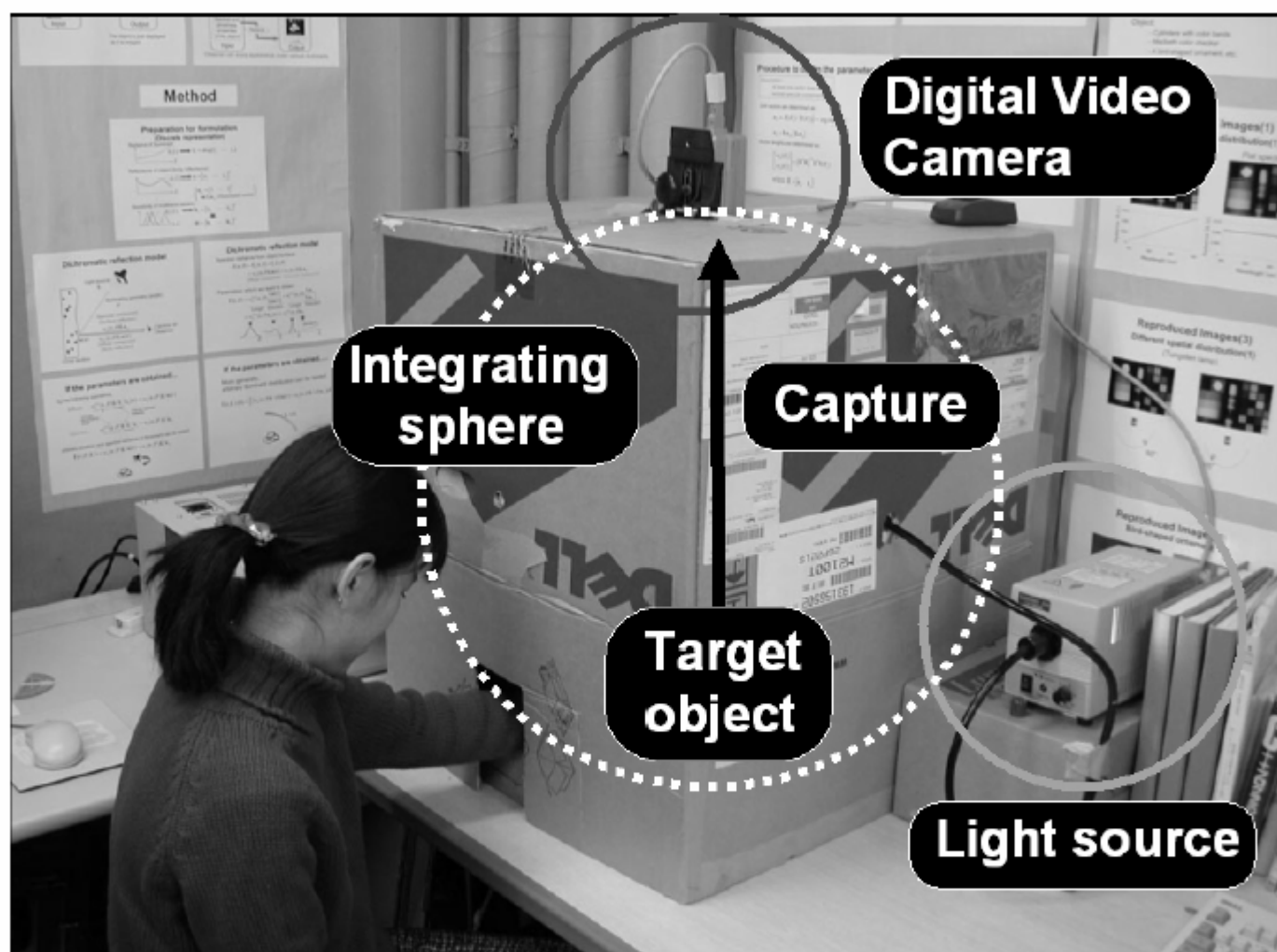
*Fig.4 Three ways to extract pigmentations from multi-band image.*



*Fig.5 Principal vector covers large range of the distribution.*



*Fig.6 System configuration.*



*Fig.7 Overview of the proposed system.*

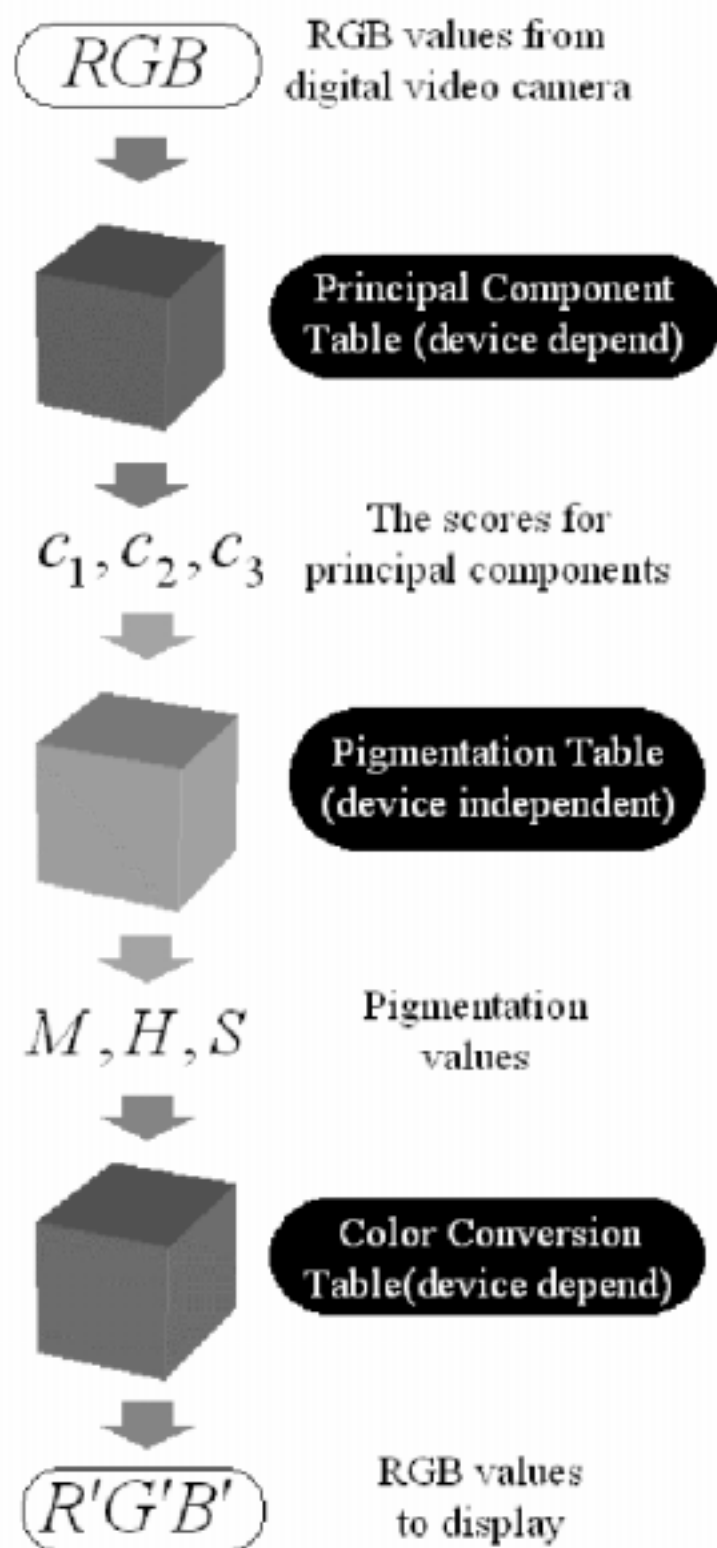


Fig.8 The flow of real-time estimation for pigmentations with look up tables.





*start measuring*



*20s later*

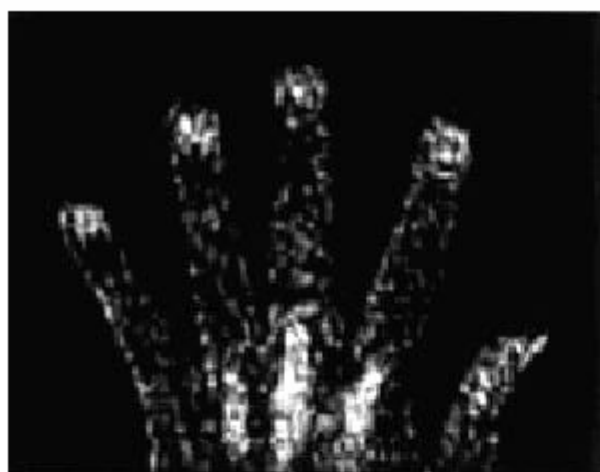


*60s later (30s later after cutting thread)*



*180s later (150s later after cutting thread)*

*Fig.9 Maps of hemoglobin density in occlusion and release.*



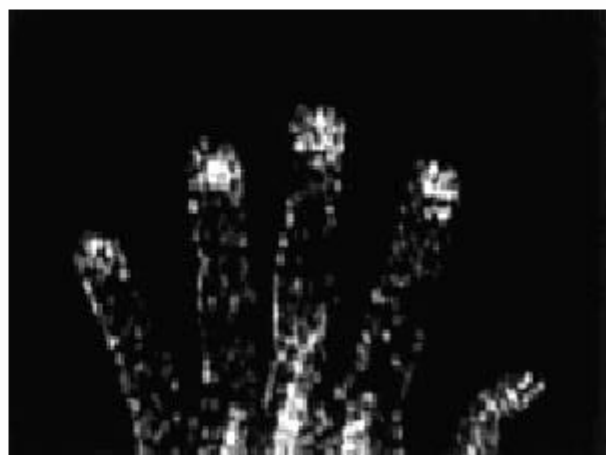
*start measuring*



*20s later*



*60s later (30s later after cutting thread)*



*180s later (150s later after cutting thread)*

*Fig. 10 Maps of oxygen saturation in occlusion and release.*



*start measuring*



*20s later*



*60s later (30s later after cutting thread)*



*180s later (150s later after cutting thread)*

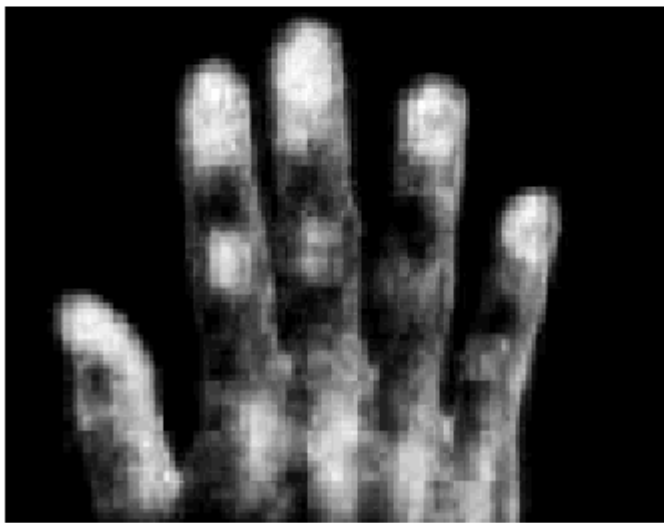
*Fig.11 Maps of melanin density in occlusion and release.*



*start exercise and mesuring*



*30s later*

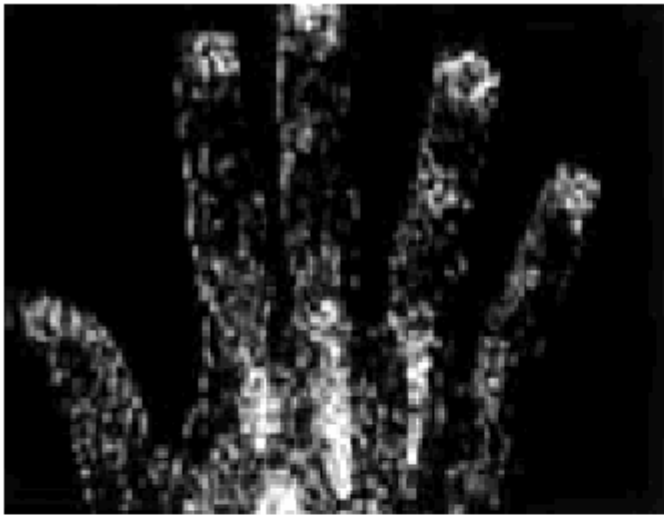


*90s later*

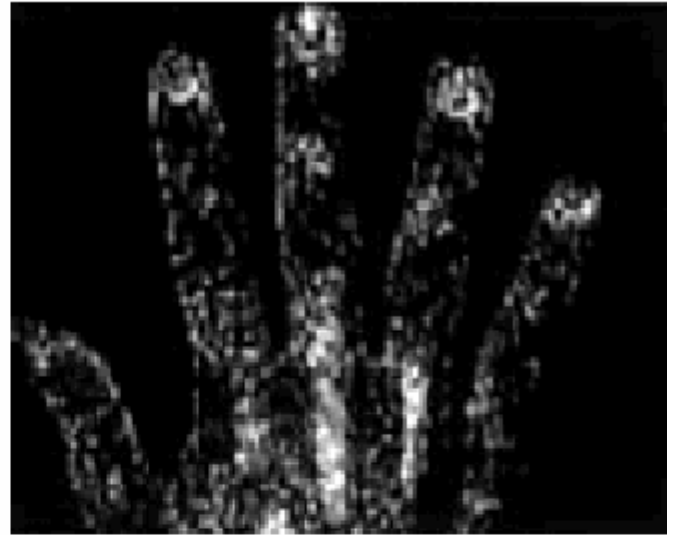


*180s later*

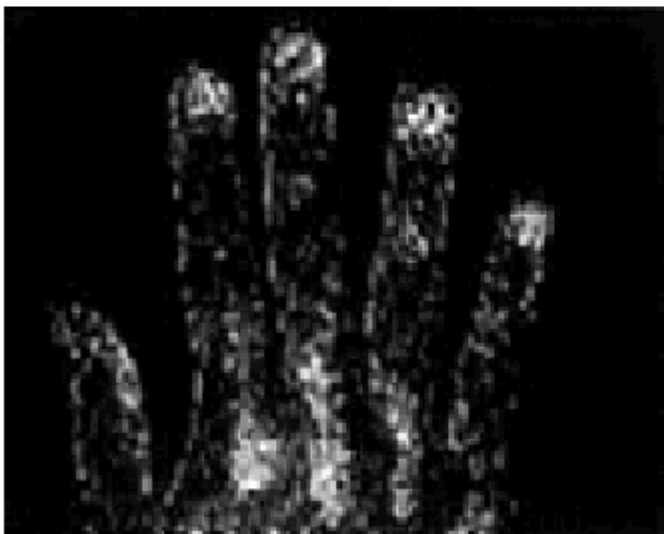
*Fig.12 Maps of hemoglobin density in anaerobic.*



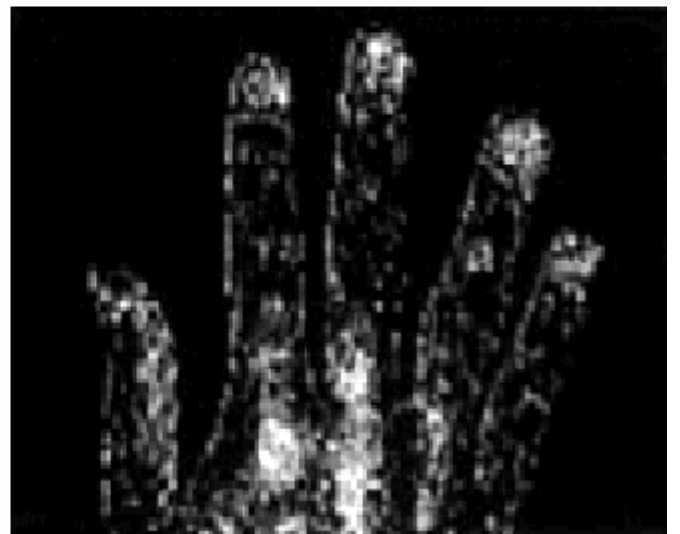
*start exercise and mesuring*



*30s later*



*90s later*



*180s later*

*Fig.13 Maps of oxygen saturation in anaerobic.*



*start exercise and mesuring*



*30s later*



*90s later*

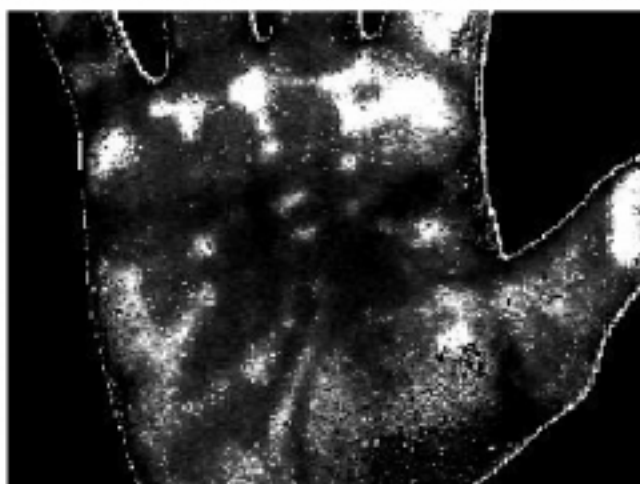


*180s later*

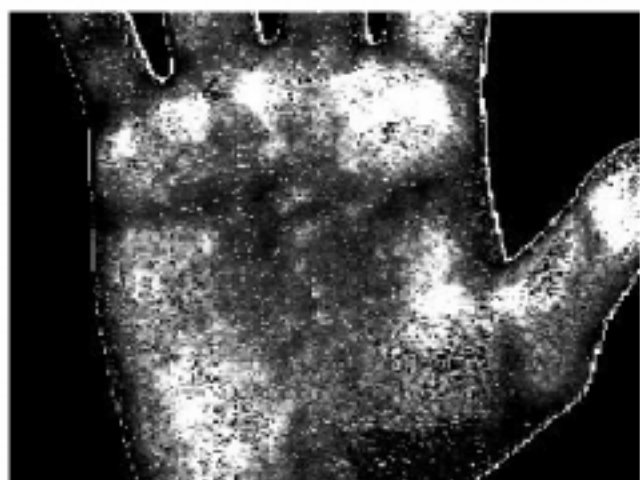
*Fig.14 Maps of melanin density in anaerobic.*



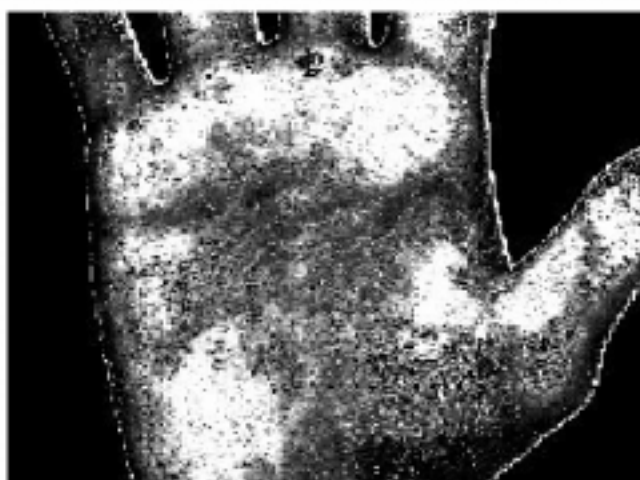
*start measuring*



*8s later(0s later after release)*

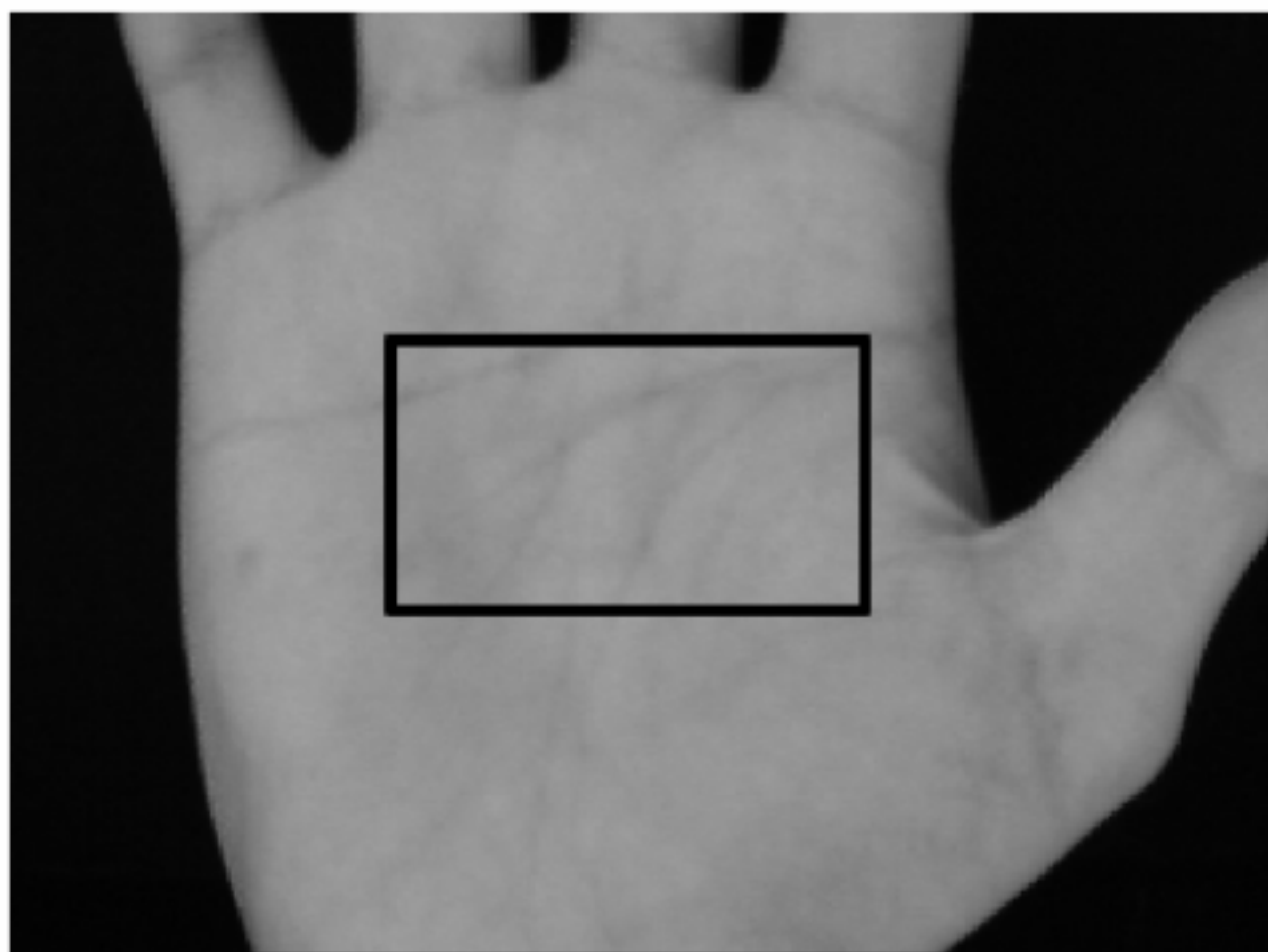


*9s later(1s later after release)*



*10s later(2s later after release)*

*Fig.15 Maps of hemoglobin density in pressure stress*



*Fig.16 Measured area in pressure stress experiment*



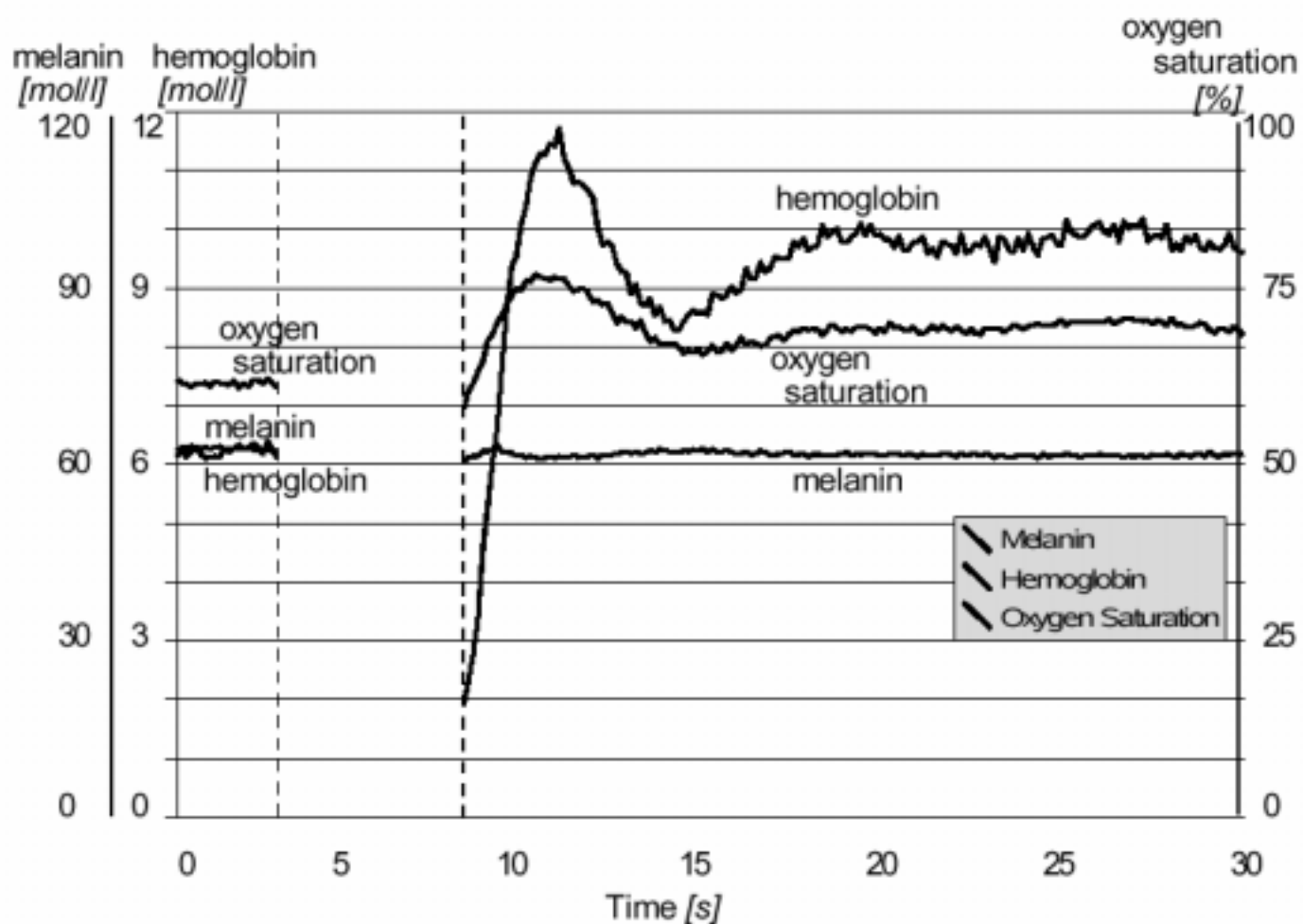


Fig.17 Real-time variance of the skin pigmentation

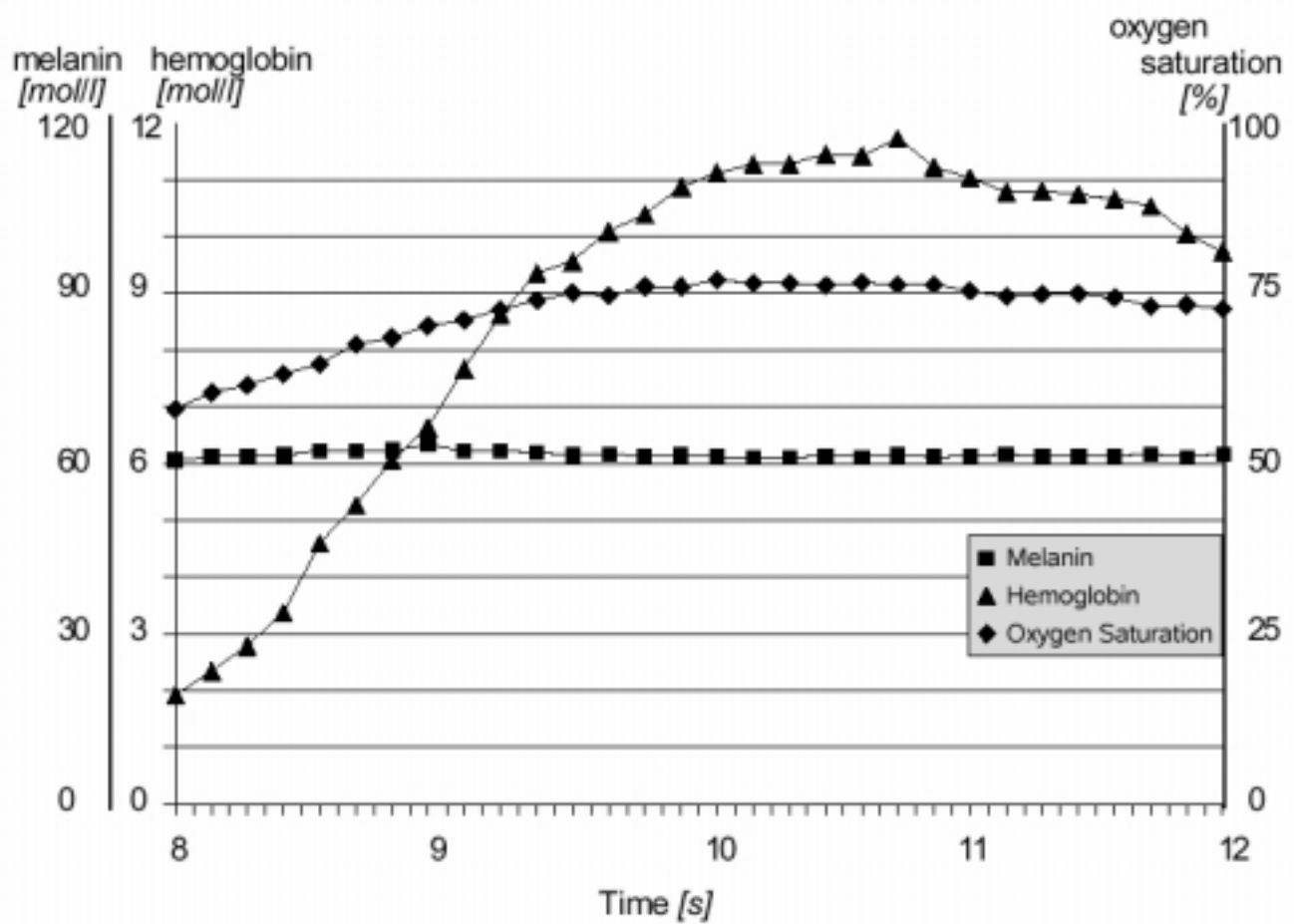


Fig.18 Real-time variance of the skin pigmentation in detail