The diving medical detectives: when diving medicine books are completely wrong 09.09.2021, Part I

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Abstract:
We compiled lists/descriptions of errors found in the standard diving medicine literature.

Methods:
We scanned our diving medicine archives and looked there for already existing error-reports; typos etc. were ignored.

Results:
Severe errors are appearing more frequently in monographs. Omnibus Volumes, written by teams of experts, are obviously more resilient to errors.

Discussion / Recommendations:
Single authors / editors should consult with expert teams prior to publication.

If you want to contribute s.th. to our list, we would be very happy if you send an e-mail to our head of lab: director@smc-de.com

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Background, continued:

Methods: As we scanned our diving medicine archives, we took the contents of chapter II (General Diving Medicine) into account and looked as well there for already existing error-reports. The numbers in brackets, [xyz] refer to the identical entries @ https://www.divetable.info/books/index_e.htm,

Typos etc. were ignored and thus do not appear in the list, as well, for eg. topics, settled for long, like Haldane's „oxygen excretion from the lung" and similar or other topics, open to conjecture, like „deep stops" or algorithms.

Results: in *Part I* we covered 6 books out of 16, for the details, pls. cf. slides # 4 → 7; severe errors are appearing more frequently in monographs. Omnibus Volumes, written by teams of experts, like [110], [157], [158] or [205] are obviously more resilient to errors.

Since it is fun to play detective, we will cover in *Part II (tbd.)* our Bühlmann collection, i.e.: [4], [4a], [5], [5a], [65], [234] and some of Alberts JAP papers.

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→ [140]

p. 34: in Figure 2.1 the slope & the times are not correct: the function is not linear, as depicted, but from p* V = const. a hyperbola:

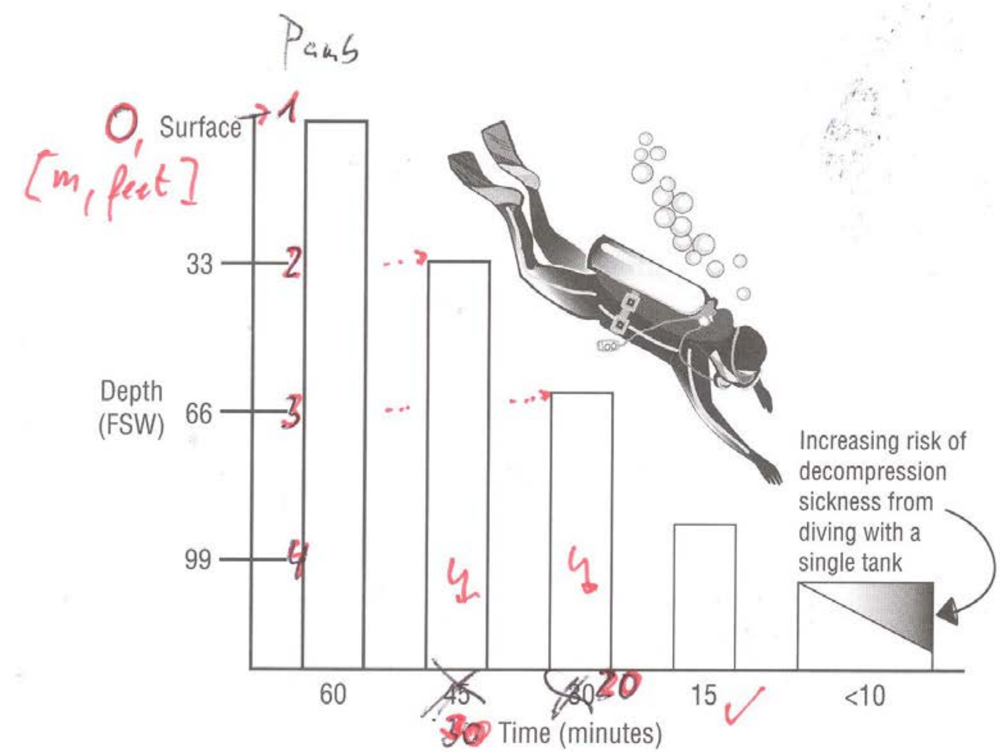

FIGURE 2.1 Approximate duration of a single 72-cubic-foot (2-cubic-meter) SCUBA tank relative to the depth of a dive. These estimates are based on normal breathing rates, depths at rest, and average-sized male divers. Durations for experienced, conditioned, and female divers may far exceed these estimates.

→ [47]

p. 23: the half-times / M-value table (table 1.2) is, alas, outright incomplete:

@ USN: missing are HT 200 – 240 [min]
@ RDP: missing are the HT 160 – 480 [min]

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Prinzipien der Druckkammertherapie

Entsprechend dem Boyle-Mariotte-Gesetz wird das Volumen eines Gases umgekehrt proportional der Druckzunahme reduziert, bei einem Druck von 2 bar wird ein ursprünglich vorhandenes Volumen auf die Hälfte reduziert. Der Durchmesser einer in Blutgefäßen auftretenden kugeligen Gasblase verändert sich jedoch nach der Formel:

$$r = \frac{1}{\sqrt{n}}$$

$1/n^{1/3}$

r = Gasblasenradius, n = Gesamtdruck in bar

Damit errechnet sich bei einem Druck von 2 bar ein Durchmesser von 0,71, wenn der anfängliche Durchmesser unter Normalbedingungen mit 1, 0 angenommen wird (Abb. 21).

Im angeführten Beispiel läßt sich zeigen, daß bei einem Druck von 4 bar eine Verringerung des Durchmessers auf 0,5 erfolgt, bei 6 bar ist der Durchmesser auf 0,41 reduziert. Eine weitere wirkungsvolle Verringerung des Gasblasendurchmessers läßt sich auch bei sehr hohen Drücken nicht mehr erzielen (bei 11 bar = 100 m Wassertiefe Reduktion auf 0,30), daher erfolgt die Druckkammertherapie normalerweise immer mit einem Anfangsdruck zwischen 4 und 6 bar, in leichten Fällen genügen gelegentlich auch geringere Druckstufen, da die relative Radiusverkleinerung anfänglich am größten und der therapeutische Effekt hoch ist. Je früher die Blasenverkleinerung in der Druckkammer

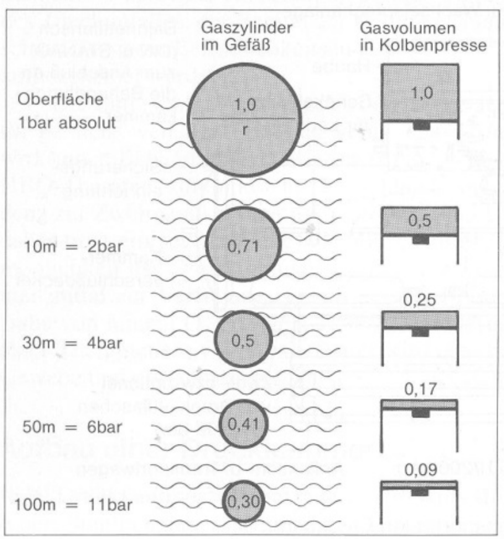

Abb. **21** Änderung des Gasblasendurchmessers unter steigendem Überdruck.

→ [236]

p. 96: the formula, the Abb. 21 and all the explanations are not correct, since the bubble radius is not proportional to $p_{abs}^{-1/2}$

but, according to Boyle-Marriotte and the bubble volume being V = 4 * π * r^3 / 3 to: $p_{abs}^{-1/3}$

→ **[63]**
p. 487, Table 10.2.1: an excursion does not
start from 25 but instead from 21 feet,
the transit times are for 20 feet or shallower.

This is, as such, probably, not a serious error,
just a misinterpretation of the USN excursion limits table (Table 16-1)
on p. 818 / 16-8 of Rev. 7 [15e] and the
according single-depth oxygen exposure limits (Table 16-2, p. 820 / 16-10)
with the very clear instruction:
„No excursions are allowed when using these limits“,
pls. cf. the next slide.

But it came up when we were checking [62] and [178] for these topics:
so, **both of them**, i.e.:

→ **[62],** Table 17.2 on p. 213 **AND**
→ **[178],** Table 17.2 on p. 235:

are not matching the original source [15e].

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Table 16-1. Excursion Limits.

Depth	Maximum Time
21-40 fsw	15 minutes
41-50 fsw	5 minutes

Transit with Excursion Limits Definitions. The following definitions are illustrated in Figure 16-2:

- Transit is the portion of the dive spent at 20 fsw or shallower.
- Excursion is the portion of the dive deeper than 20 fsw.
- Excursion time is the time between the diver's initial descent below 20 fsw and his return to 20 fsw or shallower at the end of the excursion.
- Oxygen time is calculated as the time interval between when the diver begins breathing from the CC-UBA (on-oxygen time) and the time when he discontinues breathing from the CC-UBA (off-oxygen time).

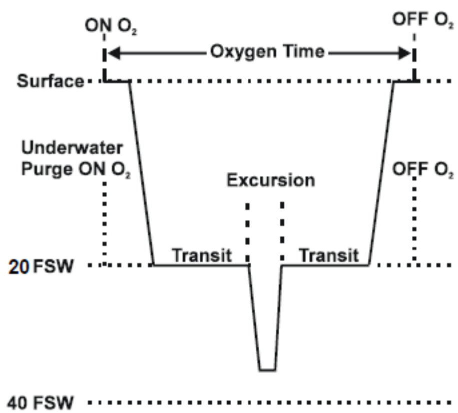

Figure 16-2. Example of Transit with Excursion.

Table 16-2. Single-Depth Oxygen Exposure Limits.

Depth	Maximum Oxygen Time
25 fsw	240 minutes
30 fsw	80 minutes
35 fsw	25 minutes
40 fsw	15 minutes
50 fsw	10 minutes

Source: [15e]

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[15 e] US DIVING MANUAL_REV7_ChangeA-6.6.18

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