COVID-19 Respiratory Sequelae

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Breathing for singing
   Typical values
   Good news/Bad news

Covid-19 respiratory sequelae (after-effects)

Why should we care?
SARS/MERS comparison
Emerging covid-19 data

The *take home* message
What we are talking about

Breathing for singing
Typical values
Good news/Bad news

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The take home message
Breathing...

Chi sa respirare, sa cantare
Breathing...

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One who breathes well, sings well

Attrib. Herbert-Caesari, Lamperti, + others

Breathing...

Chi sa respirare, sa cantare

One who breathes well, sings well

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Breathing is important for singers

Breathing 101

1. Flow

2. Pressure

3. Volumes/capacities

Breathing 101

1. **Flow**: how much air per sec.
   - TYP 0.1 to 0.2 L/sec.
   - Phrases usually < 12 sec.
   - Sing 12 sec. @ 0.2/sec. = 2.4 liters

2. **Pressure**

3. **Volumes/capacities**

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2. **Pressure**: force over an area
   TYP: 7-35 cm H₂O
   10cm H₂O = pressure holding apple
   Can go MUCH HIGHER
   How we (mostly) control loudness

3. **Volumes/capacities**
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3. **Volumes/capacities**: 3-5 L
   - TYP: Men more than women
   - Taller persons more than shorter
   - Younger persons more than older

Breathing 101

The GOOD news!

More is *not* necessarily better
Small lungs mean short vocal folds (require less airflow)
Sopranos w. big lungs can sing longer phrases than basses with small lungs

The BAD news…

Singers *rely* on breath
Singers don’t have more air (TLC) than non-singers (Gould, 1973)
They *use* the breath differently

IF breathing compromised (e.g. illness), singing “costs” more
Why should I care?
Why should I care?

Lung disease: COMMON often undiagnosed

Over 35 million Americans have chronic, preventable lung disease (before COVID-19)

Asthma, Interstitial lung disease, COPD - chronic obstructive pulmonary disease

(Pal, 2017)
Why should I care?

Lung disease: COMMON often undiagnosed

Over 35 million Americans have chronic, preventable lung disease (before COVID-19) (Pal, 2017)

1 in 10

Asthma, Interstitial lung disease, COPD - chronic obstructive pulmonary disease

(Pal, 2017)
Why *else* should I care?

Smaller ave. lung capacities?
Older, female, shorter  
*(many NATS members?)*

COVID-19 & respiratory risk
Lung disease: risk  
(1 in 10)
Persons w. smaller lung capacities: risk  
Professions requiring optimal respiration

*Vocal athletes*
Learning as we go

Few studies on rehab + long-term sequelae
(Barker-Davies et al, 2020)

Not all who catch COVID-19 will be hospitalized (Google)

If you are hospitalized (and recover):
50% chance of requiring ongoing rehab care
(Murray A et al, 2020)

https://phil.cdc.gov/Details.aspx?pid=2871
If you are hospitalized and need the ICU
Possible lasting post-recovery sequelae

Post-intensive care syndrome, aka PICS
breathing, physical, cognitive and psychological problems
(Rawal et al, 2017; Denehy, 2012; Jackson, 2012)
Predictions

Very little data on COVID-19 sequelae

Severe COVID-19 similar to SARS and MERS
Similar to SARS & MERS

Persistent respiratory + other issues > 1 year post recovery

(Herridge et al, 2003; Tansey 2007)

3 SARS studies may forecast COVID-19 respiratory sequelae:

Study 1: 6%–20% of subjects suffered muscle weakness and mild to moderate restrictive lung disease 6–8 weeks post discharge for SARS (Chan et al, 2003)

Study 2: 94 SARS survivors - about a third presented with persistent pulmonary function impairment @ 1-year follow-up. Overall health of these SARS survivors was also significantly worse than the general population. (Ong et al, 2005)

Study 3: 97 SARS survivors - 27.8% had abnormal chest radiograph findings as well as persisting reductions in exercise capacity (6-minute walk test (6MWT) at 12 months (Hui et al, 2005)

COVID-19: similar to SARS & MERS but there are differences (Sheehy et al, 2020)
What we know

**Lasting respiratory issues associated with COVID-19**
- Pulmonary lesions, alveolar injuries, other probs.
  (Tian et al, 2020; Pan et al, 2020)

**Many suffer decreased respiratory function post-COVID-19**
(Barker-Davies et al, 2020)

**Consider:**
- 66 of 70 (94%) COVID-19 patients: *lasting lung damage*
- CT scans 2 days before hospital discharge  (Wang et al, 2020)
- Clumps hardened tissue blocking blood vessels
- + lesions around alveoli

Lesions can cause chronic, long-term lung disease
similar to SARS and MERS (Cox, 2020)
What we know

*Some* lung damage will likely gradually heal or disappear

*Some* lung abnormalities will harden into layers of scar tissue (pulmonary fibrosis)

Scarring stiffens lungs - shortness of breath

Pulmonary fibrosis can limit ability to be physically active
What we know

Being asymptomatic w. COVID-19 ≠ your lungs are unaffected

A recent (June 18) study:

37 asymptomatic cases: 57% showed lung abnormalities on CT
Similar to walking pneumonia (Long et al, 2020)

https://www.pexels.com/photo/person-holding-covid-sign-3951600/
What we know

If I smash my thumb…
A concert violinist …
What we know

If I smash my thumb…
A concert violinist …

Ave. person: reduced respiratory function *may* not be debilitating
Singers and teachers of singing: can be career-ending

https://www.pexels.com/photo/black-claw-hammer-on-brown-wooden-plank-209235/
Not everyone will get COVID-19
   Not all who get it will need hospitalization
   Not all who are hospitalized will have respiratory sequelae
      (94% in one study)

Many persons (hospitalized or not) have respiratory sequelae post COVID-19
   Asymptomatic persons can suffer COVID-19 lung damage
   Not all of COVID-19’s respiratory changes will be permanent

Singers power the sound with breath – *vocal athletes*
   Small changes in respiratory function may cause a large handicap
   For some, career-ending
Lynn Helding

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https://www.pexels.com/photo/light-sign-typography-lighting-519/
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